

FINAL SUBMITTAL

**VOLUME II
APPENDIX G, PART 1**

**FEASIBILITY STUDY FOR EXPANSION OF
ENERGY MONITORING AND CONTROL SYSTEM (EMCS)
FORT DRUM, NEW YORK**

Prepared for

**NORFOLK DISTRICT
CORPS OF ENGINEERS, CENAO-EN-MC
803 FRONT STREET, NORFOLK, VIRGINIA 23510**

Under

**U.S. ARMY ENGINEER DISTRICT, MOBILE
INDEFINITE DELIVERY A-E CONTRACT
CONTRACT NO. DACA01-94-D-0033
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EMC No. 1406-006
January 1997

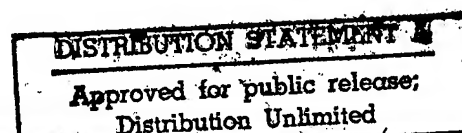
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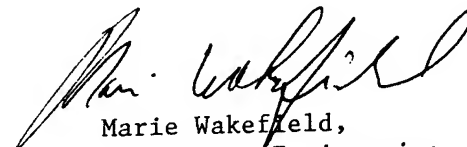


DEPARTMENT OF THE ARMY
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Marie Wakefield,
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LIST OF ABBREVIATIONS

AC	-	air conditioning
ACC	-	anticipated contract cost
ACCU	-	air cooled condensing unit
ACM	-	asbestos containing material
ACU(s)	-	auxiliary control unit(s)
AHU	-	air handling unit
AI	-	analog input
AO	-	analog output
ASCII	-	American Standard Code for Information Interchange
ASHRAE	-	American Society of Heating, Refrigeration, and Air conditioning Engineers
B/C	-	benefit-to-cost ratio
BCD	-	binary coded decimal
BLDG	-	building
BEACON	-	Building Energy Simulation Program
Btu	-	British thermal units
Btuh	-	British thermal units per hour
B/W	-	black and white
C	-	Celsius
CCC	-	central communications controller
ccf	-	one hundred (100) cubic feet
CCU	-	central control unit

cf	-	cubic foot, cubic feet
cfm	-	cubic feet per minute
CLM	-	command line mnemonic
CLMI	-	command line mnemonic interpreter
COE	-	Corps of Engineers
COS	-	central operator station
CPU	-	central processing unit
CRT	-	cathode ray tube
CU(s)	-	control unit(s)
CWE	-	current working estimate
d	-	day(s)
DCP	-	duty cycle program
DEH	-	Directorate of Engineering and Housing
DHW	-	direct memory access
DI	-	digital input
DO	-	digital output
DOD	-	Department of Defense
DPW	-	Department of Public Works
DTM	-	data transmission media
DX	-	direct expansion
E/C	-	energy-to-cost ratio
ECIP	-	Energy Conservation Investment Program
ECO	-	energy conservation opportunity

EEAP	-	energy engineering analysis program
eff	-	efficiency
elec.	-	electricity
EMC	-	EMC Engineers, Inc.
EMCS	-	energy monitoring and control system
EMI	-	electromagnetic interference
ESCO	-	energy service company
EZ-DOE	-	Building Energy Simulation Program
F	-	Fahrenheit
FO	-	fiber optic(s)
ft	-	foot, feet
ft ²	-	square feet
FY	-	fiscal year
gal	-	gallon(s)
hp	-	horsepower
hr	-	hours(s)
H & V	-	heating and ventilating
HVAC	-	heating, ventilation, and air conditioning
in.	-	inch(es)
I/O	-	input/output
kBtu	-	one thousand British thermal units
kcf	-	one thousand cubic feet

klb	-	one thousand pounds
kva	-	kilovolt - ampere
kW	-	kilowatt, one thousand watts
kWh	-	kilowatt-hour, one thousand watt-hours
lb	-	pound(s)
LCCA	-	life cycle cost analysis
LCCID	-	life cycle cost in design
LED	-	light emitting diode
LPG	-	liquefied petroleum gas
MAU	-	make-up air unit
MBtu	-	one million Btu
MCR	-	master control room
MHz	-	megahertz
Mh	-	man-hours(s)
mo	-	months(s)
MW	-	megawatt, one million watts
MWh	-	megawatt-hour, one million watt-hours
MZAHU	-	Multizone air handling unit
NA	-	Not active or Not applicable
NG	-	natural gas
NOAA	-	National Oceanic and Atmospheric Administration
no.	-	number
OA	-	outside air

O&M	-	operation and maintenance
PC	-	personal computer
PM	-	preventative maintenance
PROM	-	programmable read-only memory
psi(a)(g)	-	pounds per square inch (absolute) (gage)
RAM	-	random access memory
RCU(s)	-	remote control unit(s)
RTC	-	real-time clock
RTDOS/E	-	real-time disk operating system /executive
S&A	-	Supervision and Administration
scfm	-	sea-level cubic feet per minute
SES	-	shared energy savings
SIOH	-	supervision, inspection, and overhead
SIR	-	savings-to-investment ratio
SPW	-	single present worth
sq.ft.	-	square feet
st/sp	-	start/stop
stm	-	steam
SZAHU	-	single zone air handling unit
t	-	ton
temp	-	temperature
TRY	-	test reference year

UA	-	overall heat transfer coefficient (Btu/hr/ft ² /°F)
UCU(s)	-	unitary control unit(s)
UH	-	unit heater
UMCS	-	utility monitoring and control system
UPW	-	uniform present worth
VAV	-	variable air volume
wk	-	week(s)
yr	-	year(s)

APPENDIX G
ENERGY CALCULATIONS

APPENDIX G.1
ENERGY CONSTANT CALCULATIONS

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 20-Apr-95
BUILDING NO.: 36
BLDG. TYPE: MEDICAL CENTER

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	3217.0	1604.7	1604.7	1476.5	1476.5	
COOLING (kWH)	39966.4	32545.1	32545.1	20642.8	20642.8	

SUPPLY AIR FAN	24085 CFM
FLOOR AREA	26440 FT ²
CFMI	7180 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	700	1630	46.5 HR	HR. ON HEATING 1488 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 930 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 3888 HR/YR
	TOTAL OCCUPY HR.		46.5 HR/WK	HR. OFF COOLING 2430 HR/YR
	TOTAL UNOCC. HR.		121.5 HR/WK	
	ANNUAL OCCUPY HR.		2425 HR/YR	
	ANNUAL UNOCC. HR.		6335 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1488 = 3888 HR/YR
 HOUR SAVE (COOLING ONL 3360 - 930 = 2430 HR/YR

HOAUHC	3216.97 MBtu -	1604.742 MBtu	=	0.00E+00 Btu/CFM-HR
	7180 CFM *	6335 HR/YR		
HOAUH	3216.97 MBtu -	1604.742 MBtu	=	0.00E+00 Btu/CFM-HR
	7180 CFM *	3888 HR/YR		
COAUHC	39966.4 kWH -	32545.12 kWH	=	1.63E-04 kWH/CFM-HR
	7180 CFM *	6335 HR/YR		
COAUC	39966.4 kWH -	32545.12 kWH	=	4.25E-04 kWH/CFM-HR
	7180 CFM *	2430 HR/YR		
HOAOHC	3216.97 MBtu -	1612.228 MBtu	=	9.22E+01 Btu/CFM-HR
	7180 CFM *	2425 HR/YR		
HOAOH	3216.97 MBtu -	1612.228 MBtu	=	1.50E+02 Btu/CFM-HR
	7180 CFM *	1488 HR/YR		
COAOHC	39966.4 kWH	7421.278 kWH	=	1.87E-03 kWH/CFM-HR
	7180 CFM *	2425 HR/YR		
COAOC	39966.4 kWH	7421.278 kWH	=	4.87E-03 kWH/CFM-HR
	7180 CFM *	930 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 20-Apr-95
BUILDING NO.: 36
BLDG. TYPE: MEDICAL CENTER

ENERGY CONSTANT CALCULATIONS

ECC	32545.12 kWH -	32545.12 kWH	=	0.00E+00 kWH/CFM-HR
	24085 CFM *	930 HR/YR		
ECHC	32545.12 kWH -	32545.12 kWH	=	0.00E+00 kWH/CFM-HR
	24085 CFM *	2425 HR/YR		
NSUCHC	39966.4 kWH -	32545.12 kWH	=	4.86E-05 kWH/CFM-HR
	24085 CFM *	6335 HR/YR		
NSUCC	39966.4 kWH -	32545.12 kWH	=	7.93E-05 kWH/CFM-HR
	24085 CFM *	3888 HR/YR		
DDCCHC	32545.12 kWH -	20642.84 kWH	=	2.04E-04 kWH/CFM-HR
	24085 CFM *	2425 HR/YR		
DDCCC	32545.12 kWH -	20642.84 kWH	=	5.31E-04 kWH/CFM-HR
	24085 CFM *	930 HR/YR		
NSC	3216.97 MBtu -	1604.742 MBtu	=	6.10E+04 Btu/ft^2
	26440 AREA			
DSC	1604.742 MBtu -	1476.506 MBtu	=	4.85E+03 Btu/ft^2
	26440 AREA			
FV	1476.506 MBtu -	1476.506 MBtu	=	0.00E+00 Btu/CFM-HR
	7180 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 1750
BLDG. TYPE: MOTOR REPAIR SHOP

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	5899.2	3657.2	3657.2	3579.0	3579.0	
COOLING (kWH)	0.0	0.0	0.0	0.0	0.0	

SUPPLY AIR FAN	13370 CFM
FLOOR AREA	38336 FT ²
CFMI	10204 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	600	1730	56.5 HR	HR. ON HEATING 1808 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 1130 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 3568 HR/YR
	TOTAL OCCUPY HR.		56.5 HR/WK	HR. OFF COOLING 2230 HR/YR
	TOTAL UNOCC. HR.		111.5 HR/WK	
	ANNUAL OCCUPY HR.		2946 HR/YR	
	ANNUAL UNOCC. HR.		5814 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1808 = 3568 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1130 = 2230 HR/YR

HOAUHC	5899.2 MBtu -	3657.21 MBtu	=	0.00E+00 Btu/CFM-HR
	10204 CFM *	5814 HR/YR		
HOAUH	5899.2 MBtu -	3657.21 MBtu	=	0.00E+00 Btu/CFM-HR
	10204 CFM *	3568 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10204 CFM *	5814 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10204 CFM *	2230 HR/YR		
HOAOHC	5899.2 MBtu -	2241.99 MBtu	=	1.22E+02 Btu/CFM-HR
	10204 CFM *	2946 HR/YR		
HOAOH	5899.2 MBtu -	2241.99 MBtu	=	1.98E+02 Btu/CFM-HR
	10204 CFM *	1808 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10204 CFM *	2946 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10204 CFM *	1130 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 1750
BLDG. TYPE: MOTOR REPAIR SHOP

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	13370 CFM *	1130 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	13370 CFM *	2946 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	13370 CFM *	5814 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	13370 CFM *	3568 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	13370 CFM *	2946 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	13370 CFM *	1130 HR/YR		
NSC	5899.2 MBtu -	3657.21 MBtu	=	5.85E+04 Btu/ft^2
	38336 AREA			
DSC	3657.21 MBtu -	3579 MBtu	=	2.04E+03 Btu/ft^2
	38336 AREA			
FV	3579 MBtu -	3579 MBtu	=	0.00E+00 Btu/CFM-HR
	10204 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: IVB
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2060A
BLDG. TYPE: MNT HANGAR AVUM

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	6091.4	5845.9	5845.9	5710.1	5710.1	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	55920 CFM
FLOOR AREA	37828 FT ²
CFMI	55920 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	600	2200	80 HR	HR. ON HEATING 2080 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 1394 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 2288 HR/YR
	TOTAL OCCUPY HR.		80 HR/WK	HR. OFF COOLING 1534 HR/YR
	TOTAL UNOCC. HR.		88 HR/WK	
	ANNUAL OCCUPY HR.		4171 HR/YR	
	ANNUAL UNOCC. HR.		4589 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 2080 = 3296 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1394 = 1966 HR/YR

HOAUHC	6091.4 MBtu -	5845.9 MBtu	=	0.00E+00 Btu/CFM-HR
	55920 CFM *	4589 HR/YR		
HOAUH	6091.4 MBtu -	5845.9 MBtu	=	0.00E+00 Btu/CFM-HR
	55920 CFM *	3296 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	4589 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	1966 HR/YR		
HOAOHC	6091.4 MBtu -	245.5 MBtu	=	2.51E+01 Btu/CFM-HR
	55920 CFM *	4171 HR/YR		
HOAOH	6091.4 MBtu -	245.5 MBtu	=	5.03E+01 Btu/CFM-HR
	55920 CFM *	2080 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	4171 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	1394 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: IVB
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2060A
BLDG. TYPE: MNT HANGAR AVUM

ENERGY CONSTANT CALCULATIONS

ECC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	1394 HR/YR		
ECHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	4171 HR/YR		
NSUCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	4589 HR/YR		
NSUCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	3296 HR/YR		
DDCCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	4171 HR/YR		
DDCCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	55920 CFM *	1394 HR/YR		
NSC	6091.4 MBtu -	5845.9 MBtu	=	6.49E+03 Btu/ft^2
	37828 AREA			
DSC	5845.9 MBtu -	5710.1 MBtu	=	3.59E+03 Btu/ft^2
	37828 AREA			
FV	5710.1 MBtu -	5710.1 MBtu	=	0.00E+00 Btu/CFM-HR
	55920 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2060B
BLDG. TYPE: MNT HANGAR AVUM

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1076.4	1076.4	1076.4	831.6	831.6	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	19600 CFM
FLOOR AREA	20642 FT ²
CFMI	2940 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING 4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING 2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING 0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING 0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK	
	ANNUAL OCCUPY HR.		8760 HR/YR	
	ANNUAL UNOCC. HR.		0 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4368 = 1008 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2928 = 432 HR/YR

HOAUHC	1076.4 MBtu -	1076.4 MBtu	=	0.00E+00 Btu/CFM-HR
	2940 CFM *	0 HR/YR		
HOAUH	1076.4 MBtu -	1076.4 MBtu	=	0.00E+00 Btu/CFM-HR
	2940 CFM *	1008 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2940 CFM *	0 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2940 CFM *	432 HR/YR		
HOAOHC	1076.4 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2940 CFM *	8760 HR/YR		
HOAOH	1076.4 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2940 CFM *	4368 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2940 CFM *	8760 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2940 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2060B
BLDG. TYPE: MNT HANGAR AVUM

ENERGY CONSTANT CALCULATIONS

ECC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	19600 CFM *	2928 HR/YR		
ECHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	19600 CFM *	8760 HR/YR		
NSUCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	19600 CFM *	0 HR/YR		
NSUCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	19600 CFM *	1008 HR/YR		
DDCCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	19600 CFM *	8760 HR/YR		
DDCCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	19600 CFM *	2928 HR/YR		
NSC	1076.4 MBtu -	1076.4 MBtu	=	0.00E+00 Btu/ft^2
	20642 AREA			
DSC	1076.4 MBtu -	831.6 MBtu	=	1.19E+04 Btu/ft^2
	20642 AREA			
FV	831.6 MBtu -	831.6 MBtu	=	0.00E+00 Btu/CFM-HR
	2940 CFM *	0 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2065A
BLDG. TYPE: AF OPS BUILDING

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	5694.6	5694.6	5694.6	4575.8	0.0	
COOLING (KWH)	67524	67524	67524	38984	0	

SUPPLY AIR FAN	22705 CFM
FLOOR AREA	19308 FT²
CFMI	4592 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:

BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4368 = 1008 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2928 = 432 HR/YR

HOAUHC	5694.6 MBtu -	5694.6 MBtu	=	0.00E+00 Btu/CFM-HR
	4592 CFM *	0 HR/YR		
HOAUH	5694.6 MBtu -	5694.6 MBtu	=	0.00E+00 Btu/CFM-HR
	4592 CFM *	1008 HR/YR		
COAUHC	67524.1 KWH -	67524.1 KWH	=	0.00E+00 KWH/CFM-HR
	4592 CFM *	0 HR/YR		
COAUC	67524.1 KWH -	67524.1 KWH	=	0.00E+00 KWH/CFM-HR
	4592 CFM *	432 HR/YR		
HOAOHC	5694.6 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	4592 CFM *	8760 HR/YR		
HOAOH	5694.6 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	4592 CFM *	4368 HR/YR		
COAOHC	67524.1 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4592 CFM *	8760 HR/YR		
COAOC	67524.1 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4592 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2065A
BLDG. TYPE: AF OPS BUILDING

ENERGY CONSTANT CALCULATIONS

ECC	67524.1 kWH -	67524.1 kWH	=	0.00E+00 kWH/CFM-HR
	22705 CFM *	2928 HR/YR		
ECHC	67524.1 kWH -	67524.1 kWH	=	0.00E+00 kWH/CFM-HR
	22705 CFM *	8760 HR/YR		
NSUCHC	67524.1 kWH -	67524.1 kWH	=	0.00E+00 kWH/CFM-HR
	22705 CFM *	0 HR/YR		
NSUCC	67524.1 kWH -	67524.1 kWH	=	0.00E+00 kWH/CFM-HR
	22705 CFM *	1008 HR/YR		
DDCCHC	67524.1 kWH -	38984.05 kWH	=	1.43E-04 kWH/CFM-HR
	22705 CFM *	8760 HR/YR		
DDCCC	67524.1 kWH -	38984.05 kWH	=	4.29E-04 kWH/CFM-HR
	22705 CFM *	2928 HR/YR		
NSC	5694.6 MBtu -	5694.6 MBtu	=	0.00E+00 Btu/ft^2
	19308 AREA			
DSC	5694.6 MBtu -	4575.8 MBtu	=	5.79E+04 Btu/ft^2
	19308 AREA			
FV	4575.8 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	4592 CFM *	0 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2065B
BLDG. TYPE: AF OPS BUILDING

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	289.9	165.1	165.1	131.8	131.8	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	9660 CFM
FLOOR AREA	4322 FT ²
CFMI	4637 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	600	1700	55 HR	HR. ON HEATING 1430 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 959 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 2938 HR/YR
	TOTAL OCCUPY HR.		55 HR/WK	HR. OFF COOLING 1969 HR/YR
	TOTAL UNOCC. HR.		113 HR/WK	
	ANNUAL OCCUPY HR.		2868 HR/YR	
	ANNUAL UNOCC. HR.		5892 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1430 = 3946 HR/YR
HOUR SAVE (COOLING ONL 3360 - 959 = 2401 HR/YR

HOAUHC	289.9 MBtu -	165.1 MBtu	=	0.00E+00 Btu/CFM-HR
	4637 CFM *	5892 HR/YR		
HOAUH	289.9 MBtu -	165.1 MBtu	=	0.00E+00 Btu/CFM-HR
	4637 CFM *	3946 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	4637 CFM *	5892 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	4637 CFM *	2401 HR/YR		
HOAOHC	289.9 MBtu -	124.8 MBtu	=	1.24E+01 Btu/CFM-HR
	4637 CFM *	2868 HR/YR		
HOAOH	289.9 MBtu -	124.8 MBtu	=	2.49E+01 Btu/CFM-HR
	4637 CFM *	1430 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	4637 CFM *	2868 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	4637 CFM *	959 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 2065B
BLDG. TYPE: AF OPS BUILDING

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9660 CFM *	959 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9660 CFM *	2868 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9660 CFM *	5892 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9660 CFM *	3946 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9660 CFM *	2868 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9660 CFM *	959 HR/YR		
NSC	289.9 MBtu -	165.1 MBtu	=	2.89E+04 Btu/ft^2
	4322 AREA			
DSC	165.1 MBtu -	131.8 MBtu	=	7.70E+03 Btu/ft^2
	4322 AREA			
FV	131.8 MBtu -	131.8 MBtu	=	0.00E+00 Btu/CFM-HR
	4637 CFM *	160 HR/YR		
CHWR (0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 4230
BLDG. TYPE: MINI MALL

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1077.5	1077.5	1079.3	848.0	848.0	
COOLING (kWH)	25747	25747	22538	16751	16751	

SUPPLY AIR FAN	9375 CFM
FLOOR AREA	10220 FT ²
CFMI	2072.7 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	5376 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	3360 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 5376 = 0 HR/YR
HOUR SAVE (COOLING ONL 3360 - 3360 = 0 HR/YR

HOAUHC	1077.519 MBtu -	1077.519 MBtu	=	0.00E+00 Btu/CFM-HR
	2072.7 CFM *	0 HR/YR		
HOAUH	1077.519 MBtu -	1077.519 MBtu	=	0.00E+00 Btu/CFM-HR
	2072.7 CFM *	0 HR/YR		
COAUHC	25747.16 kWH -	25747.16 kWH	=	0.00E+00 kWH/CFM-HR
	2072.7 CFM *	0 HR/YR		
COAUC	25747.16 kWH -	25747.16 kWH	=	0.00E+00 kWH/CFM-HR
	2072.7 CFM *	0 HR/YR		
HOAOHC	1077.519 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2072.7 CFM *	8760 HR/YR		
HOAOH	1077.519 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2072.7 CFM *	5376 HR/YR		
COAOHC	25747.16 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2072.7 CFM *	8760 HR/YR		
COAOC	25747.16 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2072.7 CFM *	3360 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 4230
BLDG. TYPE: MINI MALL

ENERGY CONSTANT CALCULATIONS

ECC	25747.16 KWH -	22538.34 KWH	=	1.02E-04 KWH/CFM-HR
	9375 CFM *	3360 HR/YR		
ECHC	25747.16 KWH -	22538.34 KWH	=	3.91E-05 KWH/CFM-HR
	9375 CFM *	8760 HR/YR		
NSUCHC	25747.16 KWH -	25747.16 KWH	=	0.00E+00 KWH/CFM-HR
	9375 CFM *	0 HR/YR		
NSUCC	25747.16 KWH -	25747.16 KWH	=	0.00E+00 KWH/CFM-HR
	9375 CFM *	0 HR/YR		
DDCCHC	22538.34 KWH -	16750.61 KWH	=	7.05E-05 KWH/CFM-HR
	9375 CFM *	8760 HR/YR		
DDCCC	22538.34 KWH -	16750.61 KWH	=	1.84E-04 KWH/CFM-HR
	9375 CFM *	3360 HR/YR		
NSC	1077.519 MBtu -	1077.519 MBtu	=	0.00E+00 Btu/ft^2
	10220 AREA			
DSC	1079.306 MBtu -	848.0195 MBtu	=	2.26E+04 Btu/ft^2
	10220 AREA			
FV	848.0195 MBtu -	848.0195 MBtu	=	0.00E+00 Btu/CFM-HR
	2072.7 CFM *	0 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			=
				9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 4305
BLDG. TYPE: PHYS FIT CENTER

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	4012.6	2273.6	2273.6	1959.7	1959.7	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	67970 CFM
FLOOR AREA	32157 FT ²
CFMI	8305.9 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	645	2000	67.75 HR	HR. ON HEATING 2168 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 1355 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 3208 HR/YR
	TOTAL OCCUPY HR.		67.75 HR/WK	HR. OFF COOLING 2005 HR/YR
	TOTAL UNOCC. HR.		100.25 HR/WK	
	ANNUAL OCCUPY HR.		3533 HR/YR	
	ANNUAL UNOCC. HR.		5227 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 2168 = 3208 HR/YR
 HOUR SAVE (COOLING ONL 3360 - 1355 = 2005 HR/YR

HOAUHC	4012.611 MBtu -	2273.579 MBtu	=	0.00E+00 Btu/CFM-HR
	8305.9 CFM *	5227 HR/YR		
HOAUH	4012.611 MBtu -	2273.579 MBtu	=	0.00E+00 Btu/CFM-HR
	8305.9 CFM *	3208 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	8305.9 CFM *	5227 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	8305.9 CFM *	2005 HR/YR		
HOAOHC	4012.611 MBtu -	1739.032 MBtu	=	7.75E+01 Btu/CFM-HR
	8305.9 CFM *	3533 HR/YR		
HOAOH	4012.611 MBtu -	1739.032 MBtu	=	1.26E+02 Btu/CFM-HR
	8305.9 CFM *	2168 HR/YR		
COAOHC	0 kWH	0 kWH	=	0.00E+00 kWH/CFM-HR
	8305.9 CFM *	3533 HR/YR		
COAOC	0 kWH	0 kWH	=	0.00E+00 kWH/CFM-HR
	8305.9 CFM *	1355 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 4305
BLDG. TYPE: PHYS FIT CENTER

ENERGY CONSTANT CALCULATIONS

ECC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	67970 CFM *	1355 HR/YR		
ECHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	67970 CFM *	3533 HR/YR		
NSUCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	67970 CFM *	5227 HR/YR		
NSUCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	67970 CFM *	3208 HR/YR		
DDCCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	67970 CFM *	3533 HR/YR		
DDCCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	67970 CFM *	1355 HR/YR		
NSC	4012.611 MBtu -	2273.579 MBtu	=	5.41E+04 Btu/ft^2
	32157 AREA			
DSC	2273.579 MBtu -	1959.736 MBtu	=	9.76E+03 Btu/ft^2
	32157 AREA			
FV	1959.736 MBtu -	1959.736 MBtu	=	0.00E+00 Btu/CFM-HR
	8305.9 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 4530
BLDG. TYPE: SMA BLDNG

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	55808.2	40021.3	40021.3	38893.5	38893.5	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	135905 CFM
FLOOR AREA	195670 FT ²
CFMI	81108.5 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	730	1630	45 HR	HR. ON HEATING	2016 HR/YR
SAT.	730	1630	9 HR	HR. ON COOLING	1260 HR/YR
SUN.	730	1630	9 HR	HR. OFF HEATING	3360 HR/YR
	TOTAL OCCUPY HR.		63 HR/WK	HR. OFF COOLING	2100 HR/YR
	TOTAL UNOCC. HR.		105 HR/WK		
	ANNUAL OCCUPY HR.		3285 HR/YR		
	ANNUAL UNOCC. HR.		5475 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 2016 = 3360 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1260 = 2100 HR/YR

HOAUHC	55808.2 MBtu -	40021.3 MBtu	=	0.00E+00 Btu/CFM-HR
	81108.5 CFM *	5475 HR/YR		
HOAUH	55808.2 MBtu -	40021.3 MBtu	=	0.00E+00 Btu/CFM-HR
	81108.5 CFM *	3360 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	81108.5 CFM *	5475 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	81108.5 CFM *	2100 HR/YR		
HOAOHC	55808.2 MBtu -	15786.9 MBtu	=	1.50E+02 Btu/CFM-HR
	81108.5 CFM *	3285 HR/YR		
HOAOH	55808.2 MBtu -	15786.9 MBtu	=	2.45E+02 Btu/CFM-HR
	81108.5 CFM *	2016 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	81108.5 CFM *	3285 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	81108.5 CFM *	1260 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 4530
BLDG. TYPE: SMA BLDNG

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	135905 CFM *	1260 HR/YR		
ECHO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	135905 CFM *	3285 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	135905 CFM *	5475 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	135905 CFM *	3360 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	135905 CFM *	3285 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	135905 CFM *	1260 HR/YR		
NSC	55808.2 MBtu -	40021.3 MBtu	=	8.07E+04 Btu/ft^2
	195670 AREA			
DSC	40021.3 MBtu -	38893.5 MBtu	=	5.76E+03 Btu/ft^2
	195670 AREA			
FV	38893.5 MBtu -	38893.5 MBtu	=	0.00E+00 Btu/CFM-HR
	81108.5 CFM *	224 HR/YR		
CHWR (0.915 KW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)				
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10000
BLDG. TYPE: DIV CMD/CNTRL BUILDING

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	8226.9	3436.1	3436.1	2737.0	2617.8	
COOLING (kWH)	8726	3049	3049	3049	3049	

SUPPLY AIR FAN	130236 CFM
FLOOR AREA	80294 FT ²
CFMI	121133 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	600	1800	60 HR	HR. ON HEATING	1920 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	1200 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	3456 HR/YR
	TOTAL OCCUPY HR.		60 HR/WK	HR. OFF COOLING	2160 HR/YR
	TOTAL UNOCC. HR.		108 HR/WK		
	ANNUAL OCCUPY HR.		3129 HR/YR		
	ANNUAL UNOCC. HR.		5631 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1920 = 3456 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1200 = 2160 HR/YR

HOAUHC	8226.9 MBtu -	3436.1 MBtu	=	0.00E+00 Btu/CFM-HR
	121133 CFM *	5631 HR/YR		
HOAUH	8226.9 MBtu -	3436.1 MBtu	=	0.00E+00 Btu/CFM-HR
	121133 CFM *	3456 HR/YR		
COAUHC	8726.062 kWH -	3048.668 kWH	=	8.32E-06 kWH/CFM-HR
	121133 CFM *	5631 HR/YR		
COAUC	8726.062 kWH -	3048.668 kWH	=	2.17E-05 kWH/CFM-HR
	121133 CFM *	2160 HR/YR		
HOAOHC	8226.9 MBtu -	4790.8 MBtu	=	9.07E+00 Btu/CFM-HR
	121133 CFM *	3129 HR/YR		
HOAOH	8226.9 MBtu -	4790.8 MBtu	=	1.48E+01 Btu/CFM-HR
	121133 CFM *	1920 HR/YR		
COAOHC	8726.062 kWH -	5677.394 kWH	=	8.04E-06 kWH/CFM-HR
	121133 CFM *	3129 HR/YR		
COAOC	8726.062 kWH -	5677.394 kWH	=	2.10E-05 kWH/CFM-HR
	121133 CFM *	1200 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10000
BLDG. TYPE: DIV CMD/CNTRL BUILDING

ENERGY CONSTANT CALCULATIONS

ECC	3048.668 KWH -	3048.668 KWH	=	0.00E+00 KWH/CFM-HR
	130236 CFM *	1200 HR/YR		
ECHC	3048.668 KWH -	3048.668 KWH	=	0.00E+00 KWH/CFM-HR
	130236 CFM *	3129 HR/YR		
NSUCHC	8726.062 KWH -	3048.668 KWH	=	7.74E-06 KWH/CFM-HR
	130236 CFM *	5631 HR/YR		
NSUCC	8726.062 KWH -	3048.668 KWH	=	1.26E-05 KWH/CFM-HR
	130236 CFM *	3456 HR/YR		
DDCCHC	3048.668 KWH -	3048.668 KWH	=	0.00E+00 KWH/CFM-HR
	130236 CFM *	3129 HR/YR		
DDCCC	3048.668 KWH -	3048.668 KWH	=	0.00E+00 KWH/CFM-HR
	130236 CFM *	1200 HR/YR		
NSC	8226.9 MBtu -	3436.1 MBtu	=	5.97E+04 Btu/ft^2
	80294 AREA			
DSC	3436.1 MBtu -	2737 MBtu	=	8.71E+03 Btu/ft^2
	80294 AREA			
FV	2737 MBtu -	2617.8 MBtu	=	6.15E+00 Btu/CFM-HR
	121133 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10205
BLDG. TYPE: DENTAL CLINIC

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	2048.8	1046.1	1046.1	965.3	965.3	
COOLING (kWH)	57394	23966	23966	21599	21599	

SUPPLY AIR FAN	10430 CFM
FLOOR AREA	18546 FT ²
CFMI	3129 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1600	45 HR	HR. ON HEATING	1440 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	900 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	3936 HR/YR
	TOTAL OCCUPY HR.		45 HR/WK	HR. OFF COOLING	2460 HR/YR
	TOTAL UNOCC. HR.		123 HR/WK		
	ANNUAL OCCUPY HR.		2346 HR/YR		
	ANNUAL UNOCC. HR.		6414 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1440 = 3936 HR/YR
HOUR SAVE (COOLING ONL 3360 - 900 = 2460 HR/YR

HOAUHC	2048.838 MBtu -	1046.061 MBtu	=	0.00E+00 Btu/CFM-HR
	3129 CFM *	6414 HR/YR		
HOAUH	2048.838 MBtu -	1046.061 MBtu	=	0.00E+00 Btu/CFM-HR
	3129 CFM *	3936 HR/YR		
COAUHC	57393.7 kWH -	23965.64 kWH	=	1.67E-03 kWH/CFM-HR
	3129 CFM *	6414 HR/YR		
COAUC	57393.7 kWH -	23965.64 kWH	=	4.34E-03 kWH/CFM-HR
	3129 CFM *	2460 HR/YR		
HOAOHC	2048.838 MBtu -	1002.778 MBtu	=	1.42E+02 Btu/CFM-HR
	3129 CFM *	2346 HR/YR		
HOAOH	2048.838 MBtu -	1002.778 MBtu	=	2.32E+02 Btu/CFM-HR
	3129 CFM *	1440 HR/YR		
COAOHC	57393.7 kWH -	33428.06 kWH	=	3.26E-03 kWH/CFM-HR
	3129 CFM *	2346 HR/YR		
COAOC	57393.7 kWH -	33428.06 kWH	=	8.51E-03 kWH/CFM-HR
	3129 CFM *	900 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10205
BLDG. TYPE: DENTAL CLINIC

ENERGY CONSTANT CALCULATIONS

ECC	23965.64 KWH -	23965.64 KWH	=	0.00E+00 KWH/CFM-HR
	10430 CFM *	900 HR/YR		
ECHC	23965.64 KWH -	23965.64 KWH	=	0.00E+00 KWH/CFM-HR
	10430 CFM *	2346 HR/YR		
NSUCHC	57393.7 KWH -	23965.64 KWH	=	5.00E-04 KWH/CFM-HR
	10430 CFM *	6414 HR/YR		
NSUCC	57393.7 KWH -	23965.64 KWH	=	8.14E-04 KWH/CFM-HR
	10430 CFM *	3936 HR/YR		
DDCCHC	23965.64 KWH -	21599.32 KWH	=	9.67E-05 KWH/CFM-HR
	10430 CFM *	2346 HR/YR		
DDCCC	23965.64 KWH -	21599.32 KWH	=	2.52E-04 KWH/CFM-HR
	10430 CFM *	900 HR/YR		
NSC	2048.838 MBtu -	1046.061 MBtu	=	5.41E+04 Btu/ft^2
	18546 AREA			
DSC	1046.061 MBtu -	965.324 MBtu	=	4.35E+03 Btu/ft^2
	18546 AREA			
FV	965.324 MBtu -	965.324 MBtu	=	0.00E+00 Btu/CFM-HR
	3129 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10207
BLDG. TYPE: EXCHANGE CLUB

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1760.6	1177.3	1173.4	957.9	872.4	
COOLING (kWH)	131939	91160	77614	77631	82302	

SUPPLY AIR FAN	17100 CFM
FLOOR AREA	18199 FT ²
CFMI	5985 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	800	2700	95 HR	HR. ON HEATING	4256 HR/YR
SAT.	800	2700	19 HR	HR. ON COOLING	2660 HR/YR
SUN.	800	2700	19 HR	HR. OFF HEATING	1120 HR/YR
	TOTAL OCCUPY HR.		133 HR/WK	HR. OFF COOLING	700 HR/YR
	TOTAL UNOCC. HR.		35 HR/WK		
	ANNUAL OCCUPY HR.		6935 HR/YR		
	ANNUAL UNOCC. HR.		1825 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4256 = 1120 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2660 = 700 HR/YR

HOAUHC	1760.626 MBtu -	1177.3 MBtu	=	0.00E+00 Btu/CFM-HR
	5985 CFM *	1825 HR/YR		
HOAUH	1760.626 MBtu -	1177.3 MBtu	=	0.00E+00 Btu/CFM-HR
	5985 CFM *	1120 HR/YR		
COAUHC	131938.9 kWH -	91159.89 kWH	=	3.73E-03 kWH/CFM-HR
	5985 CFM *	1825 HR/YR		
COAUC	131938.9 kWH -	91159.89 kWH	=	9.73E-03 kWH/CFM-HR
	5985 CFM *	700 HR/YR		
HOAOHC	1760.626 MBtu -	583.3258 MBtu	=	2.84E+01 Btu/CFM-HR
	5985 CFM *	6935 HR/YR		
HOAOH	1760.626 MBtu -	583.3258 MBtu	=	4.62E+01 Btu/CFM-HR
	5985 CFM *	4256 HR/YR		
COAOHC	131938.9 kWH -	40779.02 kWH	=	2.20E-03 kWH/CFM-HR
	5985 CFM *	6935 HR/YR		
COAOC	131938.9 kWH -	40779.02 kWH	=	5.73E-03 kWH/CFM-HR
	5985 CFM *	2660 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10207
BLDG. TYPE: EXCHANGE CLUB

ENERGY CONSTANT CALCULATIONS

ECC	91159.89 KWH - 77614.48 KWH	=	2.98E-04 KWH/CFM-HR
	17100 CFM * 2660 HR/YR		
ECHC	91159.89 KWH - 77614.48 KWH	=	1.14E-04 KWH/CFM-HR
	17100 CFM * 6935 HR/YR		
NSUCHC	131938.9 KWH - 91159.89 KWH	=	1.31E-03 KWH/CFM-HR
	17100 CFM * 1825 HR/YR		
NSUCC	131938.9 KWH - 91159.89 KWH	=	2.13E-03 KWH/CFM-HR
	17100 CFM * 1120 HR/YR		
DDCCHC	77614.48 KWH - 77630.94 KWH	=	-1.39E-07 KWH/CFM-HR
	17100 CFM * 6935 HR/YR		
DDCCC	77614.48 KWH - 77630.94 KWH	=	-3.62E-07 KWH/CFM-HR
	17100 CFM * 2660 HR/YR		
NSC	1760.626 MBtu - 1177.3 MBtu	=	3.21E+04 Btu/ft^2
	18199 AREA		
DSC	1173.445 MBtu - 957.8528 MBtu	=	1.18E+04 Btu/ft^2
	18199 AREA		
FV	957.8528 MBtu - 872.4362 MBtu	=	6.37E+01 Btu/CFM-HR
	5985 CFM * 224 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)		
		=	9.6 KWH/TON
OAR	740 HR/YR * 0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10506
BLDG. TYPE: CLINIC W/O BEDS

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1373.3	896.4	896.4	826.4	826.4	
COOLING (KWH)	16887	8247	8247	4216	4216	

SUPPLY AIR FAN	9300 CFM
FLOOR AREA	18386 FT ²
CFMI	1953 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1600	45 HR	HR. ON HEATING	2016 HR/YR
SAT.	700	1600	9 HR	HR. ON COOLING	1260 HR/YR
SUN.	700	1600	9 HR	HR. OFF HEATING	3360 HR/YR
	TOTAL OCCUPY HR.		63 HR/WK	HR. OFF COOLING	2100 HR/YR
	TOTAL UNOCC. HR.		105 HR/WK		
	ANNUAL OCCUPY HR.		3285 HR/YR		
	ANNUAL UNOCC. HR.		5475 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 2016 = 3360 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1260 = 2100 HR/YR

HOAUHC	1373.334 MBtu -	896.4166 MBtu	=	0.00E+00 Btu/CFM-HR
	1953 CFM *	5475 HR/YR		
HOAUH	1373.334 MBtu -	896.4166 MBtu	=	0.00E+00 Btu/CFM-HR
	1953 CFM *	3360 HR/YR		
COAUHC	16887.43 KWH -	8247.059 KWH	=	8.08E-04 KWH/CFM-HR
	1953 CFM *	5475 HR/YR		
COAUC	16887.43 KWH -	8247.059 KWH	=	2.11E-03 KWH/CFM-HR
	1953 CFM *	2100 HR/YR		
HOAOHC	1373.334 MBtu -	476.9169 MBtu	=	1.40E+02 Btu/CFM-HR
	1953 CFM *	3285 HR/YR		
HOAOH	1373.334 MBtu -	476.9169 MBtu	=	2.28E+02 Btu/CFM-HR
	1953 CFM *	2016 HR/YR		
COAOHC	16887.43 KWH -	8640.368 KWH	=	1.29E-03 KWH/CFM-HR
	1953 CFM *	3285 HR/YR		
COAOC	16887.43 KWH -	8640.368 KWH	=	3.35E-03 KWH/CFM-HR
	1953 CFM *	1260 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10506
BLDG. TYPE: CLINIC W/O BEDS

ENERGY CONSTANT CALCULATIONS

ECC	8247.059 KWH -	8247.059 KWH	=	0.00E+00 KWH/CFM-HR
	9300 CFM *	1260 HR/YR		
ECHC	8247.059 KWH -	8247.059 KWH	=	0.00E+00 KWH/CFM-HR
	9300 CFM *	3285 HR/YR		
NSUCHC	16887.43 KWH -	8247.059 KWH	=	1.70E-04 KWH/CFM-HR
	9300 CFM *	5475 HR/YR		
NSUCC	16887.43 KWH -	8247.059 KWH	=	2.77E-04 KWH/CFM-HR
	9300 CFM *	3360 HR/YR		
DDCCHC	8247.059 KWH -	4216.2 KWH	=	1.32E-04 KWH/CFM-HR
	9300 CFM *	3285 HR/YR		
DDCCC	8247.059 KWH -	4216.2 KWH	=	3.44E-04 KWH/CFM-HR
	9300 CFM *	1260 HR/YR		
NSC	1373.334 MBtu -	896.4166 MBtu	=	2.59E+04 Btu/ft^2
	18386 AREA			
DSC	896.4166 MBtu -	826.3546 MBtu	=	3.81E+03 Btu/ft^2
	18386 AREA			
FV	826.3546 MBtu -	826.3546 MBtu	=	0.00E+00 Btu/CFM-HR
	1953 CFM *	224 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10522A
BLDG. TYPE: ADM & SUPPLY, BRK W/O DI

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1444.8	729.2	729.2	643.3		
COOLING (KWH)	0	0	0	0		

SUPPLY AIR FAN	2310 CFM
FLOOR AREA	14710 FT ²
CFMI	2310 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	600	1700	55 HR	HR. ON HEATING 1430 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 959 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 2938 HR/YR
	TOTAL OCCUPY HR.		55 HR/WK	HR. OFF COOLING 1969 HR/YR
	TOTAL UNOCC. HR.		113 HR/WK	
	ANNUAL OCCUPY HR.		2868 HR/YR	
	ANNUAL UNOCC. HR.		5892 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1430 = 3946 HR/YR
HOUR SAVE (COOLING ONL 3360 - 959 = 2401 HR/YR

HOAUHC	1444.8 MBtu -	729.2 MBtu	=	0.00E+00 Btu/CFM-HR
	2310 CFM *	5892 HR/YR		
HOAUH	1444.8 MBtu -	729.2 MBtu	=	0.00E+00 Btu/CFM-HR
	2310 CFM *	3946 HR/YR		
COAUHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	5892 HR/YR		
COAUC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	2401 HR/YR		
HOAOHC	1444.8 MBtu -	715.6 MBtu	=	1.10E+02 Btu/CFM-HR
	2310 CFM *	2868 HR/YR		
HOAOH	1444.8 MBtu -	715.6 MBtu	=	2.21E+02 Btu/CFM-HR
	2310 CFM *	1430 HR/YR		
COAOHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	2868 HR/YR		
COAOC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	959 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10522A
BLDG. TYPE: ADM & SUPPLY, BRK W/O DI

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	959 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	2868 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	5892 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	3946 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	2868 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2310 CFM *	959 HR/YR		
NSC	1444.8 MBtu -	729.2 MBtu	=	4.86E+04 Btu/ft^2
	14710 AREA			
DSC	729.2 MBtu -	643.3 MBtu	=	5.84E+03 Btu/ft^2
	14710 AREA			
FV	643.3 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2310 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10522B
BLDG. TYPE: ADM & SUPPLY, BRK W/O DI

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	2166.1	2166.1	2166.1	1757.2		
COOLING (kWH)	0	0	0	0		

SUPPLY AIR FAN	2360 CFM
FLOOR AREA	29176 FT ²
CFM1	2360 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:

BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4368 = 1008 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2928 = 432 HR/YR

HOAUHC	2166.1 MBtu -	2166.1 MBtu	=	0.00E+00 Btu/CFM-HR
	2360 CFM *	0 HR/YR		
HOAUH	2166.1 MBtu -	2166.1 MBtu	=	0.00E+00 Btu/CFM-HR
	2360 CFM *	1008 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	0 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	432 HR/YR		
HOAOHC	2166.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2360 CFM *	8760 HR/YR		
HOAOH	2166.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2360 CFM *	4368 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	8760 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10522B
BLDG. TYPE: ADM & SUPPLY, BRK W/O DI

ENERGY CONSTANT CALCULATIONS

ECC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	2928 HR/YR		
ECHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	8760 HR/YR		
NSUCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	0 HR/YR		
NSUCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	1008 HR/YR		
DDCCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	8760 HR/YR		
DDCCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2360 CFM *	2928 HR/YR		
NSC	2166.1 MBtu -	2166.1 MBtu	=	0.00E+00 Btu/ft^2
	29176 AREA			
DSC	2166.1 MBtu -	1757.2 MBtu	=	1.40E+04 Btu/ft^2
	29176 AREA			
FV	1757.2 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2360 CFM *	0 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10550
BLDG. TYPE: EN PER DIN

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	4571.8	3110.5	3110.5	2582.6	2582.6	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	29710 CFM
FLOOR AREA	15560 FT ²
CFMI	17502.75 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	400	2400	100 HR	HR. ON HEATING	4480 HR/YR
SAT.	400	2400	20 HR	HR. ON COOLING	2800 HR/YR
SUN.	400	2400	20 HR	HR. OFF HEATING	896 HR/YR
	TOTAL OCCUPY HR.		140 HR/WK	HR. OFF COOLING	560 HR/YR
	TOTAL UNOCC. HR.		28 HR/WK		
	ANNUAL OCCUPY HR.		7300 HR/YR		
	ANNUAL UNOCC. HR.		1460 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4480 = 896 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2800 = 560 HR/YR

HOAUHC	4571.76 MBtu -	3110.539 MBtu	=	0.00E+00 Btu/CFM-HR
	17502.75 CFM *	1460 HR/YR		
HOAUH	4571.76 MBtu -	3110.539 MBtu	=	0.00E+00 Btu/CFM-HR
	17502.75 CFM *	896 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	17502.75 CFM *	1460 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	17502.75 CFM *	560 HR/YR		
HOAOHC	4571.76 MBtu -	1461.221 MBtu	=	2.43E+01 Btu/CFM-HR
	17502.75 CFM *	7300 HR/YR		
HOAOH	4571.76 MBtu -	1461.221 MBtu	=	3.97E+01 Btu/CFM-HR
	17502.75 CFM *	4480 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	17502.75 CFM *	7300 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	17502.75 CFM *	2800 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10550
BLDG. TYPE: EN PER DIN

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	29710 CFM *	2800 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	29710 CFM *	7300 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	29710 CFM *	1460 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	29710 CFM *	896 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	29710 CFM *	7300 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	29710 CFM *	2800 HR/YR		
NSC	4571.76 MBtu -	3110.539 MBtu	=	9.39E+04 Btu/ft^2
	15560 AREA			
DSC	3110.539 MBtu -	2582.611 MBtu	=	3.39E+04 Btu/ft^2
	15560 AREA			
FV	2582.611 MBtu -	2582.611 MBtu	=	0.00E+00 Btu/CFM-HR
	17502.75 CFM *	224 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10630
BLDG. TYPE: BN HQ BLDG

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1429.0	651.2	651.2	590.9	2582.6	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	1440 CFM
FLOOR AREA	12452 FT ²
CFMI	1440 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	600	1700	55 HR	HR. ON HEATING 1760 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 1100 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 3616 HR/YR
	TOTAL OCCUPY HR.		55 HR/WK	HR. OFF COOLING 2260 HR/YR
	TOTAL UNOCC. HR.		113 HR/WK	
	ANNUAL OCCUPY HR.		2868 HR/YR	
	ANNUAL UNOCC. HR.		5892 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1760 = 3616 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1100 = 2260 HR/YR

HOAUHC	1429 MBtu -	651.2 MBtu	=	0.00E+00 Btu/CFM-HR
	1440 CFM *	5892 HR/YR		
HOAUH	1429 MBtu -	651.2 MBtu	=	0.00E+00 Btu/CFM-HR
	1440 CFM *	3616 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	5892 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	2260 HR/YR		
HQAHC	1429 MBtu -	777.8 MBtu	=	1.58E+02 Btu/CFM-HR
	1440 CFM *	2868 HR/YR		
HQAHC	1429 MBtu -	777.8 MBtu	=	2.57E+02 Btu/CFM-HR
	1440 CFM *	1760 HR/YR		
COAHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	2868 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	1100 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10630
BLDG. TYPE: BN HQ BLDG

ENERGY CONSTANT CALCULATIONS

ECC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	1100 HR/YR		
ECHO	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	2868 HR/YR		
NSUCHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	5892 HR/YR		
NSUCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	3616 HR/YR		
DDCCHO	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	2868 HR/YR		
DDCCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1440 CFM *	1100 HR/YR		
NSC	1429 MBtu -	651.2 MBtu	=	6.25E+04 Btu/ft^2
	12452 AREA			
DSC	651.2 MBtu -	590.9 MBtu	=	4.84E+03 Btu/ft^2
	12452 AREA			
FV	590.9 MBtu -	2582.611 MBtu	=	0.00E+00 Btu/CFM-HR
	1440 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 kWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10670
BLDG. TYPE: VEH MNT SHOP

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	5907.6	5504.7	5504.7	5401.8	5401.8	
COOLING (KWH)	0	0	0	0	0	

SUPPLY AIR FAN	129865 CFM
FLOOR AREA	43519 FT ²
CFMI	129865 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1900	60 HR	HR. ON HEATING	2688 HR/YR
SAT.	700	1900	12 HR	HR. ON COOLING	1680 HR/YR
SUN.	700	1900	12 HR	HR. OFF HEATING	2688 HR/YR
	TOTAL OCCUPY HR.		84 HR/WK	HR. OFF COOLING	1680 HR/YR
	TOTAL UNOCC. HR.		84 HR/WK		
	ANNUAL OCCUPY HR.		4380 HR/YR		
	ANNUAL UNOCC. HR.		4380 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 2688 = 2688 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1680 = 1680 HR/YR

HOAUHC	5907.612 MBtu - 5504.704 MBtu	=	0.00E+00 Btu/CFM-HR
	129865 CFM * 4380 HR/YR		
HOAUH	5907.612 MBtu - 5504.704 MBtu	=	0.00E+00 Btu/CFM-HR
	129865 CFM * 2688 HR/YR		
COAUHC	0 KWH - 0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM * 4380 HR/YR		
COAUH	0 KWH - 0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM * 1680 HR/YR		
HOAOHC	5907.612 MBtu - 402.9081 MBtu	=	9.68E+00 Btu/CFM-HR
	129865 CFM * 4380 HR/YR		
HOAOH	5907.612 MBtu - 402.9081 MBtu	=	1.58E+01 Btu/CFM-HR
	129865 CFM * 2688 HR/YR		
COAOHC	0 KWH - 0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM * 4380 HR/YR		
COAOH	0 KWH - 0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM * 1680 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)		=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)		=	0.17

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10670
BLDG. TYPE: VEH MNT SHOP

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM *	1680 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM *	4380 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM *	4380 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM *	2688 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM *	4380 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	129865 CFM *	1680 HR/YR		
NSC	5907.612 MBtu -	5504.704 MBtu	=	9.26E+03 Btu/ft^2
	43519 AREA			
DSC	5504.704 MBtu -	5401.799 MBtu	=	2.36E+03 Btu/ft^2
	43519 AREA			
FV	5401.799 MBtu -	5401.799 MBtu	=	0.00E+00 Btu/CFM-HR
	129865 CFM *	224 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10715A
BLDG. TYPE: POST SAFETY/LEA

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	2145.3	2145.3	2145.3	2085.2	2085.2	
COOLING (kWH)	1280	1280	1262	350	0	

SUPPLY AIR FAN	17240 CFM
FLOOR AREA	14790 FT ²
CFMI	5720 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4368 = 1008 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2928 = 432 HR/YR

HOAUHC	2145.3 MBtu -	2145.3 MBtu	=	0.00E+00 Btu/CFM-HR
	5720 CFM *	0 HR/YR		
HOAUH	2145.3 MBtu -	2145.3 MBtu	=	0.00E+00 Btu/CFM-HR
	5720 CFM *	1008 HR/YR		
COAUHC	1280.443 kWH -	1280.443 kWH	=	0.00E+00 kWH/CFM-HR
	5720 CFM *	0 HR/YR		
COAUC	1280.443 kWH -	1280.443 kWH	=	0.00E+00 kWH/CFM-HR
	5720 CFM *	432 HR/YR		
HOAOHC	2145.3 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	5720 CFM *	8760 HR/YR		
HOAOH	2145.3 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	5720 CFM *	4368 HR/YR		
COAOHC	1280.443 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	5720 CFM *	8760 HR/YR		
COAOC	1280.443 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	5720 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10715A
BLDG. TYPE: POST SAFETY/LEA

ENERGY CONSTANT CALCULATIONS

ECC	1280.443 KWH -	1261.928 KWH	=	3.67E-07 KWH/CFM-HR
	17240 CFM *	2928 HR/YR		
ECHC	1280.443 KWH -	1261.928 KWH	=	1.23E-07 KWH/CFM-HR
	17240 CFM *	8760 HR/YR		
NSUCHC	1280.443 KWH -	1280.443 KWH	=	0.00E+00 KWH/CFM-HR
	17240 CFM *	0 HR/YR		
NSUCC	1280.443 KWH -	1280.443 KWH	=	0.00E+00 KWH/CFM-HR
	17240 CFM *	1008 HR/YR		
DDCCHC	1261.928 KWH -	349.7014 KWH	=	6.04E-06 KWH/CFM-HR
	17240 CFM *	8760 HR/YR		
DDCCC	1261.928 KWH -	349.7014 KWH	=	1.81E-05 KWH/CFM-HR
	17240 CFM *	2928 HR/YR		
NSC	2145.3 MBtu -	2145.3 MBtu	=	0.00E+00 Btu/ft^2
	14790 AREA			
DSC	2145.3 MBtu -	2085.2 MBtu	=	4.06E+03 Btu/ft^2
	14790 AREA			
FV	2085.2 MBtu -	2085.2 MBtu	=	0.00E+00 Btu/CFM-HR
	5720 CFM *	0 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			= 9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10715B
BLDG. TYPE: POST SAFETY/LEA

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	540.5	280.8	280.8	266.6	215.3	
COOLING (KWH)	0	0	0	0	0	

SUPPLY AIR FAN	9040 CFM
FLOOR AREA	12020 FT ²
CFMI	1000 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	600	1700	55 HR	HR. ON HEATING 1430 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 959 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 2938 HR/YR
	TOTAL OCCUPY HR.		55 HR/WK	HR. OFF COOLING 1969 HR/YR
	TOTAL UNOCC. HR.		113 HR/WK	
	ANNUAL OCCUPY HR.		2868 HR/YR	
	ANNUAL UNOCC. HR.		5892 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1430 = 3946 HR/YR
HOUR SAVE (COOLING ONL 3360 - 959 = 2401 HR/YR

HOAUHC	540.5 MBtu -	280.8 MBtu	=	0.00E+00 Btu/CFM-HR
	1000 CFM *	5892 HR/YR		
HOAUH	540.5 MBtu -	280.8 MBtu	=	0.00E+00 Btu/CFM-HR
	1000 CFM *	3946 HR/YR		
COAUHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	1000 CFM *	5892 HR/YR		
COAUH	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	1000 CFM *	2401 HR/YR		
HOAOHC	540.5 MBtu -	259.7 MBtu	=	9.79E+01 Btu/CFM-HR
	1000 CFM *	2868 HR/YR		
HOAOH	540.5 MBtu -	259.7 MBtu	=	1.96E+02 Btu/CFM-HR
	1000 CFM *	1430 HR/YR		
COAOHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	1000 CFM *	2868 HR/YR		
COAOH	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	1000 CFM *	959 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10715B
BLDG. TYPE: POST SAFETY/LEA

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9040 CFM *	959 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9040 CFM *	2868 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9040 CFM *	5892 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9040 CFM *	3946 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9040 CFM *	2868 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	9040 CFM *	959 HR/YR		
NSC	540.5 MBtu -	280.8 MBtu	=	2.16E+04 Btu/ft^2
	12020 AREA			
DSC	280.8 MBtu -	266.6 MBtu	=	1.18E+03 Btu/ft^2
	12020 AREA			
FV	266.6 MBtu -	215.3 MBtu	=	3.21E+02 Btu/CFM-HR
	1000 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10730
BLDG. TYPE: CLO SALES/RETAIL/FOOD

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	6135.9	3835.6	3835.6	3053.7	2887.5	
COOLING (kWH)	95698	66920	62014	43662	65204	

SUPPLY AIR FAN	59604 CFM
FLOOR AREA	167600 FT ²
CFMI	7994.53 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	1000	2000	50 HR	HR. ON HEATING	2240 HR/YR
SAT.	1000	2000	10 HR	HR. ON COOLING	1400 HR/YR
SUN.	1000	2000	10 HR	HR. OFF HEATING	3136 HR/YR
	TOTAL OCCUPY HR.		70 HR/WK	HR. OFF COOLING	1960 HR/YR
	TOTAL UNOCC. HR.		98 HR/WK		
	ANNUAL OCCUPY HR.		3650 HR/YR		
	ANNUAL UNOCC. HR.		5110 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 2240 = 3136 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1400 = 1960 HR/YR

HOAUHC	6135.91 MBtu -	3835.565 MBtu	=	0.00E+00 Btu/CFM-HR
	7994.53 CFM *	5110 HR/YR		
HOAUH	6135.91 MBtu -	3835.565 MBtu	=	0.00E+00 Btu/CFM-HR
	7994.53 CFM *	3136 HR/YR		
COAUHC	95698.28 kWH -	66920.03 kWH	=	7.04E-04 kWH/CFM-HR
	7994.53 CFM *	5110 HR/YR		
COAUC	95698.28 kWH -	66920.03 kWH	=	1.84E-03 kWH/CFM-HR
	7994.53 CFM *	1960 HR/YR		
HOAOHC	6135.91 MBtu -	2300.345 MBtu	=	1.31E+02 Btu/CFM-HR
	7994.53 CFM *	3650 HR/YR		
HOAOH	6135.91 MBtu -	2300.345 MBtu	=	2.14E+02 Btu/CFM-HR
	7994.53 CFM *	2240 HR/YR		
COAOHC	95698.28 kWH -	28778.24 kWH	=	2.29E-03 kWH/CFM-HR
	7994.53 CFM *	3650 HR/YR		
COAOC	95698.28 kWH -	28778.24 kWH	=	5.98E-03 kWH/CFM-HR
	7994.53 CFM *	1400 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10730
BLDG. TYPE: CLO SALES/RETAIL/FOOD

ENERGY CONSTANT CALCULATIONS

ECC	66920.03 kWH - 62014.12 kWH	=	5.88E-05 kWH/CFM-HR
	59604 CFM * 1400 HR/YR		
ECHC	66920.03 kWH - 62014.12 kWH	=	2.26E-05 kWH/CFM-HR
	59604 CFM * 3650 HR/YR		
NSUCHC	95698.28 kWH - 66920.03 kWH	=	9.45E-05 kWH/CFM-HR
	59604 CFM * 5110 HR/YR		
NSUCC	95698.28 kWH - 66920.03 kWH	=	1.54E-04 kWH/CFM-HR
	59604 CFM * 3136 HR/YR		
DDCCHC	62014.12 kWH - 43661.56 kWH	=	8.44E-05 kWH/CFM-HR
	59604 CFM * 3650 HR/YR		
DDCCC	62014.12 kWH - 43661.56 kWH	=	2.20E-04 kWH/CFM-HR
	59604 CFM * 1400 HR/YR		
NSC	6135.91 MBtu - 3835.565 MBtu	=	1.37E+04 Btu/ft^2
	167600 AREA		
DSC	3835.565 MBtu - 3053.733 MBtu	=	4.66E+03 Btu/ft^2
	167600 AREA		
FV	3053.733 MBtu - 2887.493 MBtu	=	9.28E+01 Btu/CFM-HR
	7994.53 CFM * 224 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)		
		=	9.6 kWH/TON
OAR	740 HR/YR * 0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
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JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: BG
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10745
BLDG. TYPE: CHILD SUPPORT CENTER

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	3182.7	1861.1	1861.1	1517.1	1636.9	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	10563 CFM
FLOOR AREA	13500 FT ²
CFMI	10563 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	700	1900	60 HR	HR. ON HEATING 1920 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 1200 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 3456 HR/YR
	TOTAL OCCUPY HR.		60 HR/WK	HR. OFF COOLING 2160 HR/YR
	TOTAL UNOCC. HR.		108 HR/WK	
	ANNUAL OCCUPY HR.		3129 HR/YR	
	ANNUAL UNOCC. HR.		5631 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1920 = 3456 HR/YR
HOUR SAVE (COOLING ONL 3360 - 1200 = 2160 HR/YR

HOAUHC	3182.7 MBtu -	1861.095 MBtu	=	0.00E+00 Btu/CFM-HR
	10563 CFM *	5631 HR/YR		
HOAUH	3182.7 MBtu -	1861.095 MBtu	=	0.00E+00 Btu/CFM-HR
	10563 CFM *	3456 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10563 CFM *	5631 HR/YR		
COAUH	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10563 CFM *	2160 HR/YR		
HOAOHC	3182.7 MBtu -	1321.605 MBtu	=	5.63E+01 Btu/CFM-HR
	10563 CFM *	3129 HR/YR		
HOAOH	3182.7 MBtu -	1321.605 MBtu	=	9.18E+01 Btu/CFM-HR
	10563 CFM *	1920 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10563 CFM *	3129 HR/YR		
COAOH	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	10563 CFM *	1200 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)

CALCULATED BY: BG

CHECKED BY: BC

DATE: 19-Apr-95

BUILDING NO.: 10745

BLDG. TYPE: CHILD SUPPORT CENTER

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	10563 CFM *	1200 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	10563 CFM *	3129 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	10563 CFM *	5631 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	10563 CFM *	3456 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	10563 CFM *	3129 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	10563 CFM *	1200 HR/YR		
NSC	3182.7 MBtu -	1861.095 MBtu	=	9.79E+04 Btu/ft^2
	13500 AREA			
DSC	1861.095 MBtu -	1517.129 MBtu	=	2.55E+04 Btu/ft^2
	13500 AREA			
FV	1517.129 MBtu -	1636.91 MBtu	=	0.00E+00 Btu/CFM-HR
	10563 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC

DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)

CALCULATED BY:

CSW

CHECKED BY:

BC

DATE:

19-Apr-95

BUILDING NO.:

10785A

BLDG. TYPE:

CHAPEL/CHILD CARE/REL E

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	2051.0	1820.2	1820.2	1417.6	1417.6	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	18800 CFM
FLOOR AREA	40519 FT ²
CFMI	5050 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:

BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	600	1800	60 HR	HR. ON HEATING	1560 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	1046 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	2808 HR/YR
	TOTAL OCCUPY HR.		60 HR/WK	HR. OFF COOLING	1882 HR/YR
	TOTAL UNOCC. HR.		108 HR/WK		
	ANNUAL OCCUPY HR.		3129 HR/YR		
	ANNUAL UNOCC. HR.		5631 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING
 PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY
 PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

8760 HR/YR
 5376 HR/YR
 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1560 = 3816 HR/YR
 HOUR SAVE (COOLING ONL 3360 - 1046 = 2314 HR/YR

HOAUHC	2051 MBtu -	1820.2 MBtu	=	0.00E+00 Btu/CFM-HR
	5050 CFM *	5631 HR/YR		
HOAUH	2051 MBtu -	1820.2 MBtu	=	0.00E+00 Btu/CFM-HR
	5050 CFM *	3816 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	5050 CFM *	5631 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	5050 CFM *	2314 HR/YR		
HOAOHC	2051 MBtu -	230.8 MBtu	=	1.15E+02 Btu/CFM-HR
	5050 CFM *	3129 HR/YR		
HOAOH	2051 MBtu -	230.8 MBtu	=	2.31E+02 Btu/CFM-HR
	5050 CFM *	1560 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	5050 CFM *	3129 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	5050 CFM *	1046 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10785A
BLDG. TYPE: CHAPEL\CHILD CARE\REL E

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	18800 CFM *	1046 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	18800 CFM *	3129 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	18800 CFM *	5631 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	18800 CFM *	3816 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	18800 CFM *	3129 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	18800 CFM *	1046 HR/YR		
NSC	2051 MBtu -	1820.2 MBtu	=	5.70E+03 Btu/ft^2
	40519 AREA			
DSC	1820.2 MBtu -	1417.6 MBtu	=	9.94E+03 Btu/ft^2
	40519 AREA			
FV	1417.6 MBtu -	1417.6 MBtu	=	0.00E+00 Btu/CFM-HR
	5050 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			=
				9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10785B
BLDG. TYPE: CHAPELCHILD CARE/REL E

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	876.7	116.3	116.3	95.1	85.7	
COOLING (KWH)	0	0	0	0	0	

SUPPLY AIR FAN	4100 CFM
FLOOR AREA	3024 FT ²
CFMI	2000 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	0	0 HR	HR. ON HEATING	156 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	105 HR/YR
SUN.	800	1400	6 HR	HR. OFF HEATING	4212 HR/YR
	TOTAL OCCUPY HR.		6 HR/WK	HR. OFF COOLING	2823 HR/YR
	TOTAL UNOCC. HR.		162 HR/WK		
	ANNUAL OCCUPY HR.		313 HR/YR		
	ANNUAL UNOCC. HR.		8447 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 156 = 5220 HR/YR
HOUR SAVE (COOLING ONL 3360 - 105 = 3255 HR/YR

HOAUHC	876.7 MBtu -	116.3 MBtu	=	0.00E+00 Btu/CFM-HR
	2000 CFM *	8447 HR/YR		
HOAUH	876.7 MBtu -	116.3 MBtu	=	0.00E+00 Btu/CFM-HR
	2000 CFM *	5220 HR/YR		
COAUHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2000 CFM *	8447 HR/YR		
COAUC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2000 CFM *	3255 HR/YR		
HOAOHC	876.7 MBtu -	760.4 MBtu	=	1.86E+02 Btu/CFM-HR
	2000 CFM *	313 HR/YR		
HOAOH	876.7 MBtu -	760.4 MBtu	=	3.73E+02 Btu/CFM-HR
	2000 CFM *	156 HR/YR		
COAOHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2000 CFM *	313 HR/YR		
COAOC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2000 CFM *	105 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10785B
BLDG. TYPE: CHAPELCHILD CARE/REL E

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4100 CFM *	105 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4100 CFM *	313 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4100 CFM *	8447 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4100 CFM *	5220 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4100 CFM *	313 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4100 CFM *	105 HR/YR		
NSC	876.7 MBtu -	116.3 MBtu	=	2.51E+05 Btu/ft^2
	3024 AREA			
DSC	116.3 MBtu -	95.1 MBtu	=	7.01E+03 Btu/ft^2
	3024 AREA			
FV	95.1 MBtu -	85.7 MBtu	=	1.47E+02 Btu/CFM-HR
	2000 CFM *	32 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			=
				9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC

DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)

CALCULATED BY:

CSW

CHECKED BY:

BC

DATE:

19-Apr-95

BUILDING NO.:

10785C

BLDG. TYPE:

CHAPEL\CHILD CARE\REL E

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	679.9	447.6	447.6	358.8	351.3	
COOLING (kWH)	0	0	0	0	0	

SUPPLY AIR FAN	2900 CFM
FLOOR AREA	7048 FT ²
CFMI	900 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:

BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	600	1700	55 HR	HR. ON HEATING	1430 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	959 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	2938 HR/YR
	TOTAL OCCUPY HR.		55 HR/WK	HR. OFF COOLING	1969 HR/YR
	TOTAL UNOCC. HR.		113 HR/WK		
	ANNUAL OCCUPY HR.		2868 HR/YR		
	ANNUAL UNOCC. HR.		5892 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING
 PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY
 PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

8760 HR/YR
 5376 HR/YR
 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 1430 = 3946 HR/YR
 HOUR SAVE (COOLING ONL 3360 - 959 = 2401 HR/YR

HOAUHC	679.9 MBtu -	447.6 MBtu	=	4.38E+01 Btu/CFM-HR
	900 CFM *	5892 HR/YR		
HOAUH	679.9 MBtu -	447.6 MBtu	=	6.54E+01 Btu/CFM-HR
	900 CFM *	3946 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	900 CFM *	5892 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	900 CFM *	2401 HR/YR		
HOAOHC	679.9 MBtu -	232.3 MBtu	=	1.73E+02 Btu/CFM-HR
	900 CFM *	2868 HR/YR		
HOAOH	679.9 MBtu -	232.3 MBtu	=	3.48E+02 Btu/CFM-HR
	900 CFM *	1430 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	900 CFM *	2868 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	900 CFM *	959 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 10785C
BLDG. TYPE: CHAPEL CHILD CARE/REL E

ENERGY CONSTANT CALCULATIONS

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2900 CFM *	959 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2900 CFM *	2868 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2900 CFM *	5892 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2900 CFM *	3946 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2900 CFM *	2868 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	2900 CFM *	959 HR/YR		
NSC	679.9 MBtu -	447.6 MBtu	=	3.30E+04 Btu/ft^2
	7048 AREA			
DSC	447.6 MBtu -	358.8 MBtu	=	1.26E+04 Btu/ft^2
	7048 AREA			
FV	358.8 MBtu -	351.27 MBtu	=	5.23E+01 Btu/CFM-HR
	900 CFM *	160 HR/YR		
CHWR (0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)				= 9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 11050A
BLDG. TYPE: CLINIC W/O BEDS/SUPPLY/IN

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	5589.3	2746.9	2746.9	2454.7	2033.3	
COOLING (KWH)	130152	87137	87137	85702	85702	

SUPPLY AIR FAN	52876 CFM
FLOOR AREA	58017 FT²
CFMI	13545 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1900	60 HR	HR. ON HEATING	1560 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	1046 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	2808 HR/YR
	TOTAL OCCUPY HR.		60 HR/WK	HR. OFF COOLING	1882 HR/YR
	TOTAL UNOCC. HR.		108 HR/WK		
	ANNUAL OCCUPY HR.		3129 HR/YR		
	ANNUAL UNOCC. HR.		5631 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOAUC = 5589.282 MBtu - 2746.895 MBtu = 0.00E+00 Btu/CFM-HR
HOAUH = 5589.282 MBtu - 2746.895 MBtu = 0.00E+00 Btu/CFM-HR
COAUC = 130152 KWH - 87137 KWH = 5.64E-04 KWH/CFM-HR
COAUC = 130152 KWH - 87137 KWH = 1.37E-03 KWH/CFM-HR
HOAHC = 5589.282 MBtu - 2842.387 MBtu = 6.48E+01 Btu/CFM-HR
HOAHC = 5589.282 MBtu - 2842.387 MBtu = 1.30E+02 Btu/CFM-HR
COAHC = 130152 KWH - 43015 KWH = 2.06E-03 KWH/CFM-HR
COAHC = 130152 KWH - 43015 KWH = 6.15E-03 KWH/CFM-HR
DC 1 / 6 (10 MINUTES PER HOUR) = 0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR) = 0.17

HOAUC	5589.282 MBtu -	2746.895 MBtu	=	0.00E+00 Btu/CFM-HR
	13545 CFM *	5631 HR/YR		
HOAUH	5589.282 MBtu -	2746.895 MBtu	=	0.00E+00 Btu/CFM-HR
	13545 CFM *	3816 HR/YR		
COAUC	130152 KWH -	87137 KWH	=	5.64E-04 KWH/CFM-HR
	13545 CFM *	5631 HR/YR		
COAUC	130152 KWH -	87137 KWH	=	1.37E-03 KWH/CFM-HR
	13545 CFM *	2314 HR/YR		
HOAHC	5589.282 MBtu -	2842.387 MBtu	=	6.48E+01 Btu/CFM-HR
	13545 CFM *	3129 HR/YR		
HOAHC	5589.282 MBtu -	2842.387 MBtu	=	1.30E+02 Btu/CFM-HR
	13545 CFM *	1560 HR/YR		
COAHC	130152 KWH -	43015 KWH	=	2.06E-03 KWH/CFM-HR
	13545 CFM *	3129 HR/YR		
COAHC	130152 KWH -	43015 KWH	=	6.15E-03 KWH/CFM-HR
	13545 CFM *	1046 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 11050A
BLDG. TYPE: CLINIC W/O BEDS/SUPPLY/IN

ENERGY CONSTANT CALCULATIONS

ECC	87137 KWH -	87137 KWH	=	0.00E+00 KWH/CFM-HR
	52876 CFM *	1046 HR/YR		
ECHC	87137 KWH -	87137 KWH	=	0.00E+00 KWH/CFM-HR
	52876 CFM *	3129 HR/YR		
NSUCHC	130152 KWH -	87137 KWH	=	1.44E-04 KWH/CFM-HR
	52876 CFM *	5631 HR/YR		
NSUCC	130152 KWH -	87137 KWH	=	2.13E-04 KWH/CFM-HR
	52876 CFM *	3816 HR/YR		
DDCCHC	87137 KWH -	85701.7 KWH	=	8.68E-06 KWH/CFM-HR
	52876 CFM *	3129 HR/YR		
DDCCC	87137 KWH -	85701.7 KWH	=	2.60E-05 KWH/CFM-HR
	52876 CFM *	1046 HR/YR		
NSC	5589.282 MBtu -	2746.895 MBtu	=	4.90E+04 Btu/ft^2
	58017 AREA			
DSC	2746.895 MBtu -	2454.694 MBtu	=	5.04E+03 Btu/ft^2
	58017 AREA			
FV	2454.694 MBtu -	2033.336 MBtu	=	1.94E+02 Btu/CFM-HR
	13545 CFM *	160 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			=
				9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 11050B
BLDG. TYPE: CLINIC W/O BEDS/SUPPLY/IN

ENERGY CONSTANT CALCULATIONS

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1475.1	1475.1	1475.1	891.7	891.7	
COOLING (kWH)	93145	93145	93145	74890	74890	

SUPPLY AIR FAN	9295 CFM
FLOOR AREA	9278 FT ²
CFMI	2190 CFM
UA	BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

EZDOE RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	ECONOMIZER
RUN3	DDC
RUN4	FORCED VENTILATION
RUN5	

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5376 HR/YR
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3360 HR/YR

HOUR SAVE (HEATING ONL 5376 - 4368 = 1008 HR/YR
HOUR SAVE (COOLING ONL 3360 - 2928 = 432 HR/YR

HOAUHC	1475.1 MBtu -	1475.1 MBtu	=	0.00E+00 Btu/CFM-HR
	2190 CFM *	0 HR/YR		
HOAUH	1475.1 MBtu -	1475.1 MBtu	=	0.00E+00 Btu/CFM-HR
	2190 CFM *	1008 HR/YR		
COAUHC	93144.7 kWH -	93144.7 kWH	=	0.00E+00 kWH/CFM-HR
	2190 CFM *	0 HR/YR		
COAUC	93144.7 kWH -	93144.7 kWH	=	0.00E+00 kWH/CFM-HR
	2190 CFM *	432 HR/YR		
HOAOHC	1475.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2190 CFM *	8760 HR/YR		
HOAOH	1475.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	2190 CFM *	4368 HR/YR		
COAOHC	93144.7 kWH	0 kWH	=	0.00E+00 kWH/CFM-HR
	2190 CFM *	8760 HR/YR		
COAOC	93144.7 kWH	0 kWH	=	0.00E+00 kWH/CFM-HR
	2190 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

E M C ENGINEERS, INC
DENVER • ATLANTA • GERMANY

JOB: FT. DRUM, NY (EMC #1406-006)
CALCULATED BY: CSW
CHECKED BY: BC
DATE: 19-Apr-95
BUILDING NO.: 11050B
BLDG. TYPE: CLINIC W/O BEDS/SUPPLY/IN

ENERGY CONSTANT CALCULATIONS

ECC	93144.7 KWH -	93144.7 KWH	=	0.00E+00 KWH/CFM-HR
	9295 CFM *	2928 HR/YR		
ECHC	93144.7 KWH -	93144.7 KWH	=	0.00E+00 KWH/CFM-HR
	9295 CFM *	8760 HR/YR		
NSUCHC	93144.7 KWH -	93144.7 KWH	=	0.00E+00 KWH/CFM-HR
	9295 CFM *	0 HR/YR		
NSUCC	93144.7 KWH -	93144.7 KWH	=	0.00E+00 KWH/CFM-HR
	9295 CFM *	1008 HR/YR		
DDCCHC	93144.7 KWH -	74890.1 KWH	=	2.24E-04 KWH/CFM-HR
	9295 CFM *	8760 HR/YR		
DDCCC	93144.7 KWH -	74890.1 KWH	=	6.71E-04 KWH/CFM-HR
	9295 CFM *	2928 HR/YR		
NSC	1475.1 MBtu -	1475.1 MBtu	=	0.00E+00 Btu/ft^2
	9278 AREA			
DSC	1475.1 MBtu -	891.7 MBtu	=	6.29E+04 Btu/ft^2
	9278 AREA			
FV	891.7 MBtu -	891.7 MBtu	=	0.00E+00 Btu/CFM-HR
	2190 CFM *	0 HR/YR		
CHWR	(0.915 kW X 0.012 Eff. X 436 HRS X 2 Degrees of Reset)			
			=	9.6 KWH/TON
OAR	740 HR/YR *	0.01	=	7.4 HR/YR

APPENDIX G.2
ENERGY SAVINGS CALCULATIONS

ENERGY CALCULATIONS

BUILDING 30

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

30

Building Sq.Ft.: 12,578

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 30
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
Sub Total	0.0	12,801.7	174.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,801.7	237.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

30

Building Sq.Ft.: 12,578

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 30
System Type: 2
System Name: H&V UNIT
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	200.8	
Sub Total	0.0	15,122.3	200.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	72.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,122.3	273.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

30

Building Sq.Ft.: 12,578

System Type 2

System Name: H&V UNIT

System Number: AHU3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 30
System Type 2
System Name: H&V UNIT
System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.2	
Sub Total	0.0	18,308.0	177.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	64.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	18,308.0	241.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

30

Building Sq.Ft.: 12,578

System Type 2

System Name: H&V UNIT

System Number: AHU4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 30

System Type 2

System Name: H&V UNIT

System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	283.5	
Sub Total	0.0	27,177.0	283.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	102.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	27,177.0	385.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 30

Building Sq.Ft.: 12,578

System Type 2

System Name: H&V UNIT

System Number: AHU5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 30
System Type 2
System Name: H&V UNIT
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	118.1	
Sub Total	0.0	11,550.2	118.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	42.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	11,550.2	160.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

30

Building Sq.Ft.: 12,578

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 30
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	18.9	
Sub Total	0.0	7,181.9	18.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	7,181.9	25.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 30

Building Sq.Ft.: 12,578

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
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Bldg Number: 30
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	87.4	
Sub Total	0.0	3,637.0	87.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	31.6	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	3,637.0	130.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 30

Building Sq.Ft.: 10,868

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	100.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	0.00E+00
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 30

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 30

Building Sq.Ft.: 10,868

System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE1A

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 30

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	11.1	3

ENERGY CALCULATIONS

BUILDING 36

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC1M

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	760
CFM - CLG	760
% OA	33.55%
% Area	8.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAV	2,260	
Heating HRSAV	3,616	
C/H HRSAV	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC1M

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	9,256.6	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	3.1	0.0	0.0	
Night Setback	0.0	0.0	133.9	
Sub Total	3.1	9,544.1	133.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	7.8	0.0	
DDC Control	0.0	1,157.4	10.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	3.1	10,709.3	144.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 6
System Name: MULTI-ZONE AHU
System Number: AC2M

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	4255
CFM - CLG	4255
% OA	33.61%
% Area	8.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95

PAGE 2 OF 2

Bldg Number: 36
System Type 6
System Name: MULTI-ZONE AHU
System Number: AC2M

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	22,908.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	133.9	
Sub Total	7.3	23,595.7	133.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	43.8	0.0	
DDC Control	0.0	6,479.7	10.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
TOTAL	7.3	30,119.2	144.5	6

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type: 6
System Name: MULTI-ZONE AHU
System Number: AC3M

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4630
CFM - CLG	4630
% OA	33.61%
% Area	8.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95

PAGE 2 OF 2

Bldg Number: 36

System Type 6

System Name: MULTI-ZONE AHU

System Number: AC3M

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	42,456.5	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	13.9	0.0	0.0	
Night Setback	0.0	0.0	133.9	
Sub Total	13.9	43,763.5	133.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	47.7	0.0	
DDC Control	0.0	7,050.7	10.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
TOTAL	13.9	50,861.9	144.5	6

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type: 6
System Name: MULTI-ZONE AHU
System Number: AC4M

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	7490
CFM - CLG	7490
% OA	33.61%
% Area	8.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type: 6
System Name: MULTI-ZONE AHU
System Number: AC4M

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	43,379.6	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	13.9	0.0	0.0	
Night Setback	0.0	0.0	133.9	
Sub Total	13.9	44,686.6	133.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	77.1	0.0	
DDC Control	0.0	11,406.0	10.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
TOTAL	13.9	56,169.8	144.5	6

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 8
System Name: CHILLER AND PUMPS
System Number: ACC1M

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	20.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRS AV	2,260	
Heating HRS AV	3,616	
C/H HRS AV	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type 8
System Name: CHILLER AND PUMPS
System Number: ACC1M

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,922.1	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	2.6	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	2.6	3,165.1	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	199.1	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	2.6	3,364.2	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 8

System Name: CHILLER AND PUMPS

System Number: ACC2M

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	20.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type: 8
System Name: CHILLER AND PUMPS
System Number: ACC2M

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,922.1	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	2.6	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	2.6	3,165.1	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	199.1	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	2.6	3,364.2	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type: 6
System Name: MULTI-ZONE AHU
System Number: AHU1A

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	6950
CFM - CLG	6950
% OA	23.02%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type 6
System Name: MULTI-ZONE AHU
System Number: AHU1A

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	33,256.4	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	241.9	
Sub Total	10.8	34,268.5	241.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	49.0	0.0	
DDC Control	0.0	10,583.7	19.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
TOTAL	10.8	44,901.2	261.2	6

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.333333
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	25.00%
TON CAPC.	0
MBTU CAPC.	2.008
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAV	2,260	
Heating HRSAV	3,616	
C/H HRSAV	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95

PAGE 2 OF 2

Bldg Number: 36
System Type: 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,106.1	0.0	
Optimum ST/SP	0.0	57.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	403.2	
Sub Total	0.0	1,163.6	403.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	32.1	
HW OA Reset	0.0	0.0	14.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,163.6	450.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.333333
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	25.00%
TON CAPC.	0
MBTU CAPC.	2.008
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type: 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,106.1	0.0	
Optimum ST/SP	0.0	57.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	403.2	
Sub Total	0.0	1,163.6	403.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	32.1	
HW OA Reset	0.0	0.0	14.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,163.6	450.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 36

Building Sq.Ft.: 26,440

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

EMC NO.: 1406-006

DATE: 20-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
1	BRICK	MEDICAL CENTER	0700-1600	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAB	2,260	
Heating HRSAB	3,616	
C/H HRSAB	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.25E-04	4.25E-04
COAUHC	1.63E-04	1.63E-04
HOAOH	150.00	150.00
HOAOHC	92.20	92.20
COAOC	4.87E-03	4.87E-03
COAOHC	1.87E-03	1.87E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	7.93E-05	7.93E-05
NSUCHC	4.86E-05	4.86E-05
DDCCHC	2.04E-04	2.04E-04
DDCCC	5.31E-04	5.31E-04
DSC	4.85E+03	4.85E+03
NSC	6.10E+04	6.10E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 20-Apr-95
PAGE 2 OF 2

Bldg Number: 36
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,078.8	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	80.6	
Sub Total	0.0	5,240.9	80.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,240.9	87.1	3

ENERGY CALCULATIONS

BUILDING 119

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

119

Building Sq.Ft.: 14,954

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 119
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	196.2	
Sub Total	0.0	8,501.7	196.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	211.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

119

Building Sq.Ft.: 14,954

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 119
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	37.4	
Sub Total	0.0	4,791.4	37.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	40.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

119

Building Sq.Ft.: 14,954

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 119
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 119

Building Sq.Ft.: 14,954

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 119

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	700.6	
Sub Total	0.0	2,397.8	700.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	54.3	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	755.7	3

ENERGY CALCULATIONS

BUILDING 173

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 173

Building Sq.Ft.: 65,700

System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	100.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	0.00E+00
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 173
System Type: 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 173

Building Sq.Ft.: 65,700

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	5.976
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 173
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.2	3

ENERGY CALCULATIONS

BUILDING 174

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 174

Building Sq.Ft.: 26,161

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 174
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	343.2	
Sub Total	0.0	8,501.7	343.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	26.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	369.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 174

Building Sq.Ft.: 26,161

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 174

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	65.4	
Sub Total	0.0	4,791.4	65.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	70.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 174

Building Sq.Ft.: 26,161

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	20.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 174

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	326.8	
Sub Total	0.0	5,328.6	326.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	25.3	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	354.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 174

Building Sq.Ft.: 26,161

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 174

System Type: 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,225.6	
Sub Total	0.0	2,397.8	1,225.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	95.0	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	1,321.4	3

ENERGY CALCULATIONS

BUILDING 175

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 175

Building Sq.Ft.: 65,700

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	100.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	0.00E+00
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 175
System Type: 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

175

Building Sq.Ft.: 19,439

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
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Bldg Number: 175
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
Sub Total	0.0	12,801.7	174.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,801.7	237.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

175

Building Sq.Ft.: 19,439

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 175

System Type 2

System Name: H&V UNIT

System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	310.3	
Sub Total	0.0	15,122.3	310.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	112.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,122.3	422.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 175

Building Sq.Ft.: 19,439

System Type 2

System Name: H&V UNIT

System Number: AHU3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 175

System Type 2

System Name: H&V UNIT

System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	273.8	
Sub Total	0.0	18,308.0	273.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	18,308.0	372.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

175

Building Sq.Ft.: 19,439

System Type 2

System Name: H&V UNIT

System Number: AHU4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 175
System Type 2
System Name: H&V UNIT
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	438.1	
Sub Total	0.0	27,177.0	438.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	158.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	27,177.0	596.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

175

Building Sq.Ft.: 19,439

System Type 2

System Name: H&V UNIT

System Number: AHU5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
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Bldg Number: 175
System Type 2
System Name: H&V UNIT
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	182.5	
Sub Total	0.0	11,550.2	182.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	66.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	11,550.2	248.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10150

Building Sq.Ft.: 18,460

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 10150

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	27.7	
Sub Total	0.0	7,181.9	27.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	7,181.9	37.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

175

Building Sq.Ft.: 19,439

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 175

System Type: 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	135.1	
Sub Total	0.0	3,637.0	135.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	48.8	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	3,637.0	195.0	3

ENERGY CALCULATIONS

BUILDING 1750

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 1750

Building Sq.Ft.: 38,336

System Type 12
System Name: BASEBOARD RADIATION
System Number: FT1-8

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1500	1500	1500	1500	1500	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAB	2,360	
Heating HRSAB	3,776	
C/H HRSAB	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95
PAGE 2 OF 2

Bldg Number: 1750
System Type: 12
System Name: BASEBOARD RADIATION
System Number: FT1-8

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	168.1	
Sub Total	0.0	0.0	168.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	174.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 1750

Building Sq.Ft.: 38,336

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 10-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1500	1500	1500	1500	1500	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.3878
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAV	2,360	
Heating HRSAV	3,776	
C/H HRSAV	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

10-Apr-95

PAGE 2 OF 2

Bldg Number: 1750

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	20,327.7	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	21,339.8	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	12.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	21,339.8	12.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 1750

Building Sq.Ft.: 38,336

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1500	1500	1500	1500	1500	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	3290
CFM - CLG	0
% OA	10.00%
% Area	20.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAB	2,360	
Heating HRSAB	3,776	
C/H HRSAB	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95
PAGE 2 OF 2

Bldg Number: 1750
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	33,123.3	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	459.6	
Sub Total	0.0	34,135.3	459.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	16.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	34,135.3	475.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 1750

Building Sq.Ft.: 38,336

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV2

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1500	1500	1500	1500	1500	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	10.00%
% Area	12.13%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAV	2,360	
Heating HRSAV	3,776	
C/H HRSAV	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95
PAGE 2 OF 2

Bldg Number: 1750
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	9,410.4	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	272.0	
Sub Total	0.0	9,697.9	272.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	9,697.9	281.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 1750

Building Sq.Ft.: 38,336

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV3

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1500	1500	1500	1500	1500	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	4850
CFM - CLG	0
% OA	100.00%
% Area	48.10%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAV	2,360	
Heating HRSAV	3,776	
C/H HRSAV	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95

PAGE 2 OF 2

Bldg Number: 1750

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,955.3	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,078.4	
Sub Total	0.0	8,198.4	1,078.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	37.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,198.4	1,116.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 1750

Building Sq.Ft.: 38,336

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV4

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1500	1500	1500	1500	1500	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	4000
CFM - CLG	0
% OA	100.00%
% Area	9.91%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAB	2,360	
Heating HRSAB	3,776	
C/H HRSAB	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95

PAGE 2 OF 2

Bldg Number: 1750
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,955.3	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	222.2	
Sub Total	0.0	8,198.4	222.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,198.4	229.9	3

ENERGY CALCULATIONS

BUILDING 2049

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	100.00%
% Area	37.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049

System Type: 2

System Name: H&V UNIT

System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	142.3	
Sub Total	0.0	1,633.7	142.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	142.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANG	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	6300
CFM - CLG	0
% OA	100.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049

System Type 2

System Name: H&V UNIT

System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	100.0	
Sub Total	0.0	1,307.0	100.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,307.0	100.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	100.00%
% Area	37.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049
System Type 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	142.3	
Sub Total	0.0	1,633.7	142.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	142.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	9750
CFM - CLG	0
% OA	100.00%
% Area	31.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2049
System Type 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	27,509.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	135.8	
Sub Total	0.0	28,521.2	135.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	25.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	28,521.2	161.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 2

System Name: H&V UNIT

System Number: HV5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	4.24%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049

System Type 2

System Name: H&V UNIT

System Number: HV5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,574.7	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	18.1	
Sub Total	0.0	12,000.6	18.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,000.6	21.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 2

System Name: H&V UNIT

System Number: HV6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	8200
CFM - CLG	0
% OA	100.00%
% Area	26.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049

System Type 2

System Name: H&V UNIT

System Number: HV6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	114.5	
Sub Total	0.0	19,363.7	114.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	21.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	136.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 2

System Name: H&V UNIT

System Number: HV7

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	7100
CFM - CLG	0
% OA	100.00%
% Area	23.20%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049

System Type 2

System Name: H&V UNIT

System Number: HV7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	99.1	
Sub Total	0.0	19,363.7	99.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	18.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	118.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	0	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2049
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	0	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2049

Building Sq.Ft.: 15,836

System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAV	800	
Heating HRSAV	1,280	
C/H HRSAV	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2049

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,209.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	59.8	
Sub Total	0.0	15,149.4	59.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,149.4	71.2	3

ENERGY CALCULATIONS

BUILDING 2050

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANG	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	100.00%
% Area	37.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050
System Type 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	142.3	
Sub Total	0.0	1,633.7	142.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	142.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANG	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	6300
CFM - CLG	0
% OA	100.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050
System Type 2
System Name: H&V UNIT
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	100.0	
Sub Total	0.0	1,307.0	100.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,307.0	100.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANC	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	100.00%
% Area	37.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050

System Type 2

System Name: H&V UNIT

System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	142.3	
Sub Total	0.0	1,633.7	142.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	142.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type: 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	9750
CFM - CLG	0
% OA	100.00%
% Area	31.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050
System Type 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	27,509.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	137.4	
Sub Total	0.0	28,521.2	137.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	26.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	28,521.2	163.6	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type: 2

System Name: H&V UNIT

System Number: HV5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	4.24%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 2050
System Type 2
System Name: H&V UNIT
System Number: HV5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,574.7	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	18.3	
Sub Total	0.0	12,000.6	18.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,000.6	21.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type 2

System Name: H&V UNIT

System Number: HV6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	8200
CFM - CLG	0
% OA	100.00%
% Area	26.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050
System Type: 2
System Name: H&V UNIT
System Number: HV6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	115.8	
Sub Total	0.0	19,363.7	115.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	22.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	137.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type: 2

System Name: H&V UNIT

System Number: HV7

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	7100
CFM - CLG	0
% OA	100.00%
% Area	23.20%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050
System Type 2
System Name: H&V UNIT
System Number: HV7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	100.3	
Sub Total	0.0	19,363.7	100.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	19.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	119.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0.00%
MOSON	7
EFF	80.00%
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0.00%
MOSON	7
EFF	80.00%
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2050

Building Sq.Ft.: 16,020

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAB	800	
Heating HRSAB	1,280	
C/H HRSAB	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2050

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,209.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	60.5	
Sub Total	0.0	15,149.4	60.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,149.4	72.0	3

ENERGY CALCULATIONS

BUILDING 2060

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 10,545

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
4	BRICK	MNT HANGAR AVUM - OPS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	19600
CFM - CLG	0
% OA	14.56%
% Area	86.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.59E+03	4.59E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	41.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	41.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: MAU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	100.00%
% Area	8.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060
System Type 2
System Name: H&V UNIT
System Number: MAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	74.1	
Sub Total	0.0	1,079.5	74.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,079.5	74.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060
System Type 2
System Name: H&V UNIT
System Number: RMAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060
System Type: 2
System Name: H&V UNIT
System Number: RMAU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060
System Type 2
System Name: H&V UNIT
System Number: RMAU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060

System Type: 2

System Name: H&V UNIT

System Number: RMAU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU5

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060

System Type 2

System Name: H&V UNIT

System Number: RMAU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	1,600
Heating HRSON	2,880	2,560
C/H HRSON	4,693	4,171
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 2060
System Type 2
System Name: H&V UNIT
System Number: RMAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 10,545

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
4	BRICK	MNT HANGAR AVUM - OP	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.59E+03	4.59E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	35.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	35.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 37,828

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	2200	2200	2200	2200	2200	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,800	3,360
Heating HRSON	2,880	5,376
C/H HRSON	4,693	8,760
Cooling HRSAV	1,560	
Heating HRSAV	2,496	
C/H HRSAV	4,067	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	35.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	35.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2060

Building Sq.Ft.: 10,545

System Type 12
System Name: BASEBOARD RADIATION
System Number: RAD

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
4	BRICK	MNT HANGAR AVUM - OP	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time		0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.59E+03	4.59E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2060

System Type 12

System Name: BASEBOARD RADIATION

System Number: RAD

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	6.8	3

ENERGY CALCULATIONS

BUILDING 2065

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.26
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	9.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	9.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.26
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	9.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	9.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 12
System Name: BASEBOARD RADIATION
System Number: HX1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	10.70%
TON CAPC.	0
MBTU CAPC.	1.0984
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type 12

System Name: BASEBOARD RADIATION

System Number: HX1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	124.9	
HW OA Reset	0.0	0.0	8.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	133.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	2215
CFM - CLG	0
% OA	12.66%
% Area	12.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065
System Type 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	124.5	
Sub Total	0.0	287.5	124.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	139.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type: 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	6545
CFM - CLG	0
% OA	65.80%
% Area	37.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065
System Type: 2
System Name: H&V UNIT
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	369.4	
Sub Total	0.0	1,012.1	369.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	44.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,012.1	413.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 4,322

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
6	BRICK	AF OPS BUILDING-ADMIN	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	6545
CFM - CLG	0
% OA	12.68%
% Area	64.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	24.90	24.90
HOAOHC	12.42	12.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	7.70E+03	7.70E+03
NSC	2.89E+04	2.89E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	19,629.4	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	79.9	
Sub Total	0.0	20,316.6	79.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	21.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	20,316.6	101.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	3000
CFM - CLG	0
% OA	31.60%
% Area	17.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type: 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	169.5	
Sub Total	0.0	687.1	169.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	20.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	687.1	189.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MU1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	900
CFM - CLG	0
% OA	43.40%
% Area	5.23%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	61.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	61.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MU2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	3840
CFM - CLG	0
% OA	100.00%
% Area	22.10%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	258.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	258.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1000
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	7.3	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	7.3	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1000
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	7.3	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	7.3	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1000
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	7.3	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	7.3	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC4A

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1000
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC4A

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	7.3	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	7.3	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC5

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1000
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC5

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	7.3	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	7.3	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC6

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	20
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1600
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC6

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	27.1	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	27.1	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	27.1	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC7

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	20
Load Factor	0.8
CFM - HTG	0
CFM - CLG	1600
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AC7

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	27.1	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	27.1	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	27.1	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC8

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	700
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC8

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	7.3	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	7.3	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC9

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	2415
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065

System Type: 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AC9

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	10.8	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0		0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	10.8	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 11
System Name: CONDENSING UNIT
System Number: ACC1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	1.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type: 11
System Name: CONDENSING UNIT
System Number: ACC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	17.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	17.2	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 11

System Name: CONDENSING UNIT

System Number: ACC2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	1.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type: 11
System Name: CONDENSING UNIT
System Number: ACC2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	17.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	17.2	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 11
System Name: CONDENSING UNIT
System Number: ACC4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	1.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type 11
System Name: CONDENSING UNIT
System Number: ACC4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	17.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	17.2	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 11

System Name: CONDENSING UNIT

System Number: ACC5

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	1.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type: 11
System Name: CONDENSING UNIT
System Number: ACC5

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	17.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	17.2	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 11

System Name: CONDENSING UNIT

System Number: ACC6

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	2.92
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 2065
System Type 11
System Name: CONDENSING UNIT
System Number: ACC6

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	27.9	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	27.9	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2065

Building Sq.Ft.: 20,144

System Type 11
System Name: CONDENSING UNIT
System Number: ACC7

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
5	BRICK	AF OPS BUILDING-NON A	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	2.92
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	1.43E-04	1.43E-04
DDCCC	4.29E-04	4.29E-04
DSC	5.79E+04	5.79E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 2065
System Type 11
System Name: CONDENSING UNIT
System Number: ACC7

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	27.9	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	27.9	0.0	3

ENERGY CALCULATIONS

BUILDING 2070

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 10,545

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10020
CFM - CLG	0
% OA	14.56%
% Area	57.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	52,733.8	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,591.5	
Sub Total	0.0	54,673.9	1,591.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	303.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	54,673.9	1,894.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 10,545

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	3900
CFM - CLG	0
% OA	14.56%
% Area	22.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 2070
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	617.9	
Sub Total	0.0	19,363.7	617.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	117.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	735.6	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 10,545

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OPS	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	1020
CFM - CLG	0
% OA	27.00%
% Area	5.87%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,516.9	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	161.9	
Sub Total	0.0	3,646.3	161.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	30.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	3,646.3	192.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: MAU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANG	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	14746
CFM - CLG	0
% OA	100.00%
% Area	12.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type 2
System Name: H&V UNIT
System Number: MAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	260.0	
Sub Total	0.0	1,633.7	260.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	260.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: MAU2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANC	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	13945
CFM - CLG	0
% OA	100.00%
% Area	11.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type 2
System Name: H&V UNIT
System Number: MAU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	245.2	
Sub Total	0.0	1,940.1	245.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	245.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANG	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.46%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type 2
System Name: H&V UNIT
System Number: RMAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	178.8	
Sub Total	0.0	1,940.1	178.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	178.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 2070
System Type: 2
System Name: H&V UNIT
System Number: RMAU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.5	
Sub Total	0.0	1,940.1	177.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	177.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type: 2
System Name: H&V UNIT
System Number: RMAU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.5	
Sub Total	0.0	1,940.1	177.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	177.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

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Bldg Number: 2070

System Type 2

System Name: H&V UNIT

System Number: RMAU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.5	
Sub Total	0.0	1,940.1	177.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	177.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU5

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

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Bldg Number: 2070
System Type 2
System Name: H&V UNIT
System Number: RMAU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.5	
Sub Total	0.0	1,940.1	177.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	177.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 2070
System Type: 2
System Name: H&V UNIT
System Number: RMAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.5	
Sub Total	0.0	1,940.1	177.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	177.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU7

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type: 2
System Name: H&V UNIT
System Number: RMAU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.5	
Sub Total	0.0	1,940.1	177.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	177.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 2

System Name: H&V UNIT

System Number: RMAU8

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HANG	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10395
CFM - CLG	0
% OA	100.00%
% Area	8.46%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type 2
System Name: H&V UNIT
System Number: RMAU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	178.8	
Sub Total	0.0	1,940.1	178.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	178.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	6.695
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAV	800	
Heating HRSAV	1,280	
C/H HRSAV	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,209.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	15,149.4	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	49.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,149.4	49.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2070

Building Sq.Ft.: 91,771

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	6.695
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAV	800	
Heating HRSAV	1,280	
C/H HRSAV	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 2070
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	49.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	49.5	3

ENERGY CALCULATIONS

BUILDING 2072

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 7,811

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	13720
CFM - CLG	0
% OA	14.56%
% Area	86.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	27,509.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	181.2	
Sub Total	0.0	28,521.2	181.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.2	
DDC Control	0.0	0.0	34.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	28,521.2	215.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: MAU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	100.00%
% Area	8.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2072
System Type: 2
System Name: H&V UNIT
System Number: MAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	74.1	
Sub Total	0.0	1,079.5	74.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,079.5	74.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072

System Type 2

System Name: H&V UNIT

System Number: RMAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072
System Type: 2
System Name: H&V UNIT
System Number: RMAU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072

System Type 2

System Name: H&V UNIT

System Number: RMAU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072
System Type 2
System Name: H&V UNIT
System Number: RMAU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCM/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072
System Type: 2
System Name: H&V UNIT
System Number: RMAU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 37,828

System Type 2

System Name: H&V UNIT

System Number: RMAU6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9320
CFM - CLG	0
% OA	100.00%
% Area	15.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072
System Type: 2
System Name: H&V UNIT
System Number: RMAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.3	
Sub Total	0.0	1,940.1	133.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,940.1	133.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 7,811

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	0	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2072

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 7,811

System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	0	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number:

2072

System Type

10

System Name:

HOT WATER BOILER AND PUMPS

System Number:

B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2072

Building Sq.Ft.: 7,811

System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAB	800	
Heating HRSAB	1,280	
C/H HRSAB	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2072
System Type: 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,209.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	29.5	
Sub Total	0.0	15,149.4	29.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,149.4	35.1	3

ENERGY CALCULATIONS

BUILDING 2074

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	14.56%
% Area	37.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074
System Type: 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	142.3	
Sub Total	0.0	1,633.7	142.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	142.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	6300
CFM - CLG	0
% OA	100.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074

System Type: 2

System Name: H&V UNIT

System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	100.0	
Sub Total	0.0	1,307.0	100.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,307.0	100.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,704

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
3	BRICK	MNT HANGAR AVUM-HAN	0600-2200	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	12.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	14.56%
% Area	37.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	37.50	37.50
HOAOHC	18.70	18.70
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	0.00E+00	0.00E+00
NSC	2.30E+04	2.30E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074
System Type 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,633.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	142.3	
Sub Total	0.0	1,633.7	142.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,633.7	142.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,179

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	9750
CFM - CLG	0
% OA	100.00%
% Area	31.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074
System Type 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	27,509.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	138.8	
Sub Total	0.0	28,521.2	138.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	26.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	28,521.2	165.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,179

System Type 2

System Name: H&V UNIT

System Number: HV5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	42.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074

System Type 2

System Name: H&V UNIT

System Number: HV5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,574.7	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	185.0	
Sub Total	0.0	12,000.6	185.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	35.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,000.6	220.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,179

System Type 2

System Name: H&V UNIT

System Number: HV6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	8200
CFM - CLG	0
% OA	100.00%
% Area	26.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074

System Type 2

System Name: H&V UNIT

System Number: HV6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	117.0	
Sub Total	0.0	19,363.7	117.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	22.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	139.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,179

System Type 2

System Name: H&V UNIT

System Number: HV7

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	7100
CFM - CLG	0
% OA	100.00%
% Area	23.20%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2074
System Type 2
System Name: H&V UNIT
System Number: HV7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
Sub Total	0.0	19,363.7	101.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	19.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	120.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,179

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	0	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2074
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 16,179

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.8
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	0	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 2074

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	44.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	44.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2074

Building Sq.Ft.: 15,836

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
28	BRICK	MNT HANGAR AVUM - OP	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAB	800	
Heating HRSAB	1,280	
C/H HRSAB	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	123.59	123.59
HOAOHC	61.63	61.63
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.14E+03	5.14E+03
NSC	2.70E+04	2.70E+04
FV	1	1
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 2074
System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,209.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	59.8	
Sub Total	0.0	15,149.4	59.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,149.4	71.2	3

ENERGY CALCULATIONS

BUILDING 2792

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2792

Building Sq.Ft.: 7,424

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	1800	1800	1800	1800	1800	1800	1800

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2500
CFM - CLG	5000
% OA	24.90%
% Area	64.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,680
Heating HRSON	2,240	2,688
C/H HRSON	3,650	4,380
Cooling HRS AV	280	
Heating HRS AV	448	
C/H HRS AV	730	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 2792
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	943.9	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	277.9	
Sub Total	0.0	1,186.9	277.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,186.9	287.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 2792

Building Sq.Ft.: 7,424

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.576
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 2792
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	4.3	3

ENERGY CALCULATIONS

BUILDING 4230

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4230

Building Sq.Ft.: 10,220

System Type 7

System Name: VAV AHU

System Number: AH-2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
7	BRICK	MINI MALL WITH GAS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6.5
Load Factor	0.8
CFM - HTG	3620
CFM - CLG	3620
% OA	35.00%
% Area	25.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	1.02E-04	1.02E-04
ECHC	3.91E-05	3.91E-05
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	7.05E-05	7.05E-05
DDCCC	1.84E-04	1.84E-04
DSC	2.26E+04	2.26E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4230
System Type 7
System Name: VAV AHU
System Number: AH-2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,270.5	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	25,270.5	0.0	
Economizer	0.0	486.8	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	2,289.0	57.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
TOTAL	0.0	28,046.3	57.8	6

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4230

Building Sq.Ft.: 10,220

System Type 11
System Name: CONDENSING UNIT
System Number: ACCU-1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
7	BRICK	MINI MALL WITH GAS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	20
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	1.02E-04	1.02E-04
ECHC	3.91E-05	3.91E-05
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	7.05E-05	7.05E-05
DDCCC	1.84E-04	1.84E-04
DSC	2.26E+04	2.26E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 4230
System Type 11
System Name: CONDENSING UNIT
System Number: ACCU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	191.4	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	191.4	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4230

Building Sq.Ft.: 10,220

System Type: 11
System Name: CONDENSING UNIT
System Number: ACCU-2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
7	BRICK	MINI MALL WITH GAS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	10
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	1.02E-04	1.02E-04
ECHC	3.91E-05	3.91E-05
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	7.05E-05	7.05E-05
DDCCC	1.84E-04	1.84E-04
DSC	2.26E+04	2.26E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 4230
System Type 11
System Name: CONDENSING UNIT
System Number: ACCU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	95.7	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	95.7	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4230

Building Sq.Ft.: 10,220

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B-1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
7	BRICK	MINI MALL WITH GAS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	100.00%
TON CAPC.	0
MBTU CAPC.	0.94
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	1.02E-04	1.02E-04
ECHC	3.91E-05	3.91E-05
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	7.05E-05	7.05E-05
DDCCC	1.84E-04	1.84E-04
DSC	2.26E+04	2.26E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4230
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,246.4	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	2,246.4	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	231.3	
HW OA Reset	0.0	0.0	7.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,246.4	238.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4230

Building Sq.Ft.: 10,220

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B-2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
7	BRICK	MINI MALL WITH GAS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	100.00%
TON CAPC.	0
MBTU CAPC.	0.94
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	1.02E-04	1.02E-04
ECHC	3.91E-05	3.91E-05
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	7.05E-05	7.05E-05
DDCCC	1.84E-04	1.84E-04
DSC	2.26E+04	2.26E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4230
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,246.4	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	2,246.4	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	231.3	
HW OA Reset	0.0	0.0	7.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,246.4	238.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4230

Building Sq.Ft.: 10,220

System Type: 7

System Name: VAV AHU

System Number: AH-1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
7	BRICK	MINI MALL WITH GAS	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	5755
CFM - CLG	5755
% OA	14.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	1.02E-04	1.02E-04
ECHC	3.91E-05	3.91E-05
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	7.05E-05	7.05E-05
DDCCC	1.84E-04	1.84E-04
DSC	2.26E+04	2.26E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 4230
System Type 7
System Name: VAV AHU
System Number: AH-1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	19,438.9	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	19,438.9	0.0	
Economizer	0.0	773.8	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	3,639.0	173.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
TOTAL	0.0	23,851.7	173.5	6

ENERGY CALCULATIONS

BUILDING 4305

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

Building Sq.Ft.: 32,157

System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.632
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	12.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	12.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

Building Sq.Ft.: 32,157

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	2000	2000	2000	2000	2000	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	3.264
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,500	3,360
Heating HRSON	2,400	5,376
C/H HRSON	3,911	8,760
Cooling HRSAB	1,860	
Heating HRSAB	2,976	
C/H HRSAB	4,849	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,551.6	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	4,839.1	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	24.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,839.1	24.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

Building Sq.Ft.: 32,157

System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	2000	2000	2000	2000	2000	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,500	3,360
Heating HRSON	2,400	5,376
C/H HRSON	3,911	8,760
Cooling HRSAB	1,860	
Heating HRSAB	2,976	
C/H HRSAB	4,849	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	27.8	
Sub Total	0.0	0.0	27.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	32.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

Building Sq.Ft.: 32,157

System Type 2

System Name: H&V UNIT

System Number: HV-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	2000	2000	2000	2000	2000	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	65
Load Factor	0.8
CFM - HTG	38230
CFM - CLG	0
% OA	15.20%
% Area	87.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	91.70% 91.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,500	3,360
Heating HRSON	2,400	5,376
C/H HRSON	3,911	8,760
Cooling HRSAB	1,860	
Heating HRSAB	2,976	
C/H HRSAB	4,849	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305

System Type: 2

System Name: H&V UNIT

System Number: HV-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	205,030.1	0.0	
Optimum ST/SP	0.0	7,948.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,513.0	
Sub Total	0.0	212,978.9	1,513.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	273.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	212,978.9	1,786.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

Building Sq.Ft.: 32,157

System Type 2

System Name: H&V UNIT

System Number: HV2A

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	17.5
Load Factor	0.8
CFM - HTG	13780
CFM - CLG	0
% OA	8.71%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305

System Type 2

System Name: H&V UNIT

System Number: HV2A

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

Building Sq.Ft.: 32,157

System Type 2

System Name: H&V UNIT

System Number: HV2B

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	10840
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305
System Type 2
System Name: H&V UNIT
System Number: HV2B

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4305

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 32,157

System Type 2

System Name: H&V UNIT

System Number: HV3

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	2000	2000	2000	2000	2000	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6.5
Load Factor	0.8
CFM - HTG	5120
CFM - CLG	0
% OA	26.37%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,500	3,360
Heating HRSON	2,400	5,376
C/H HRSON	3,911	8,760
Cooling HRSAB	1,860	
Heating HRSAB	2,976	
C/H HRSAB	4,849	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4305
System Type: 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	23,040.8	0.0	
Optimum ST/SP	0.0	893.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	128.7	
Sub Total	0.0	23,934.0	128.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	23.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	23,934.0	151.9	3

ENERGY CALCULATIONS

BUILDING 4325

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4325

Building Sq.Ft.: 21,720

System Type: 12
System Name: BASEBOARD RADIATION
System Number: HX-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	600	1900	1900	1900	1900	1900	600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	2.155
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,720	3,360
Heating HRSON	2,752	5,376
C/H HRSON	4,484	8,760
Cooling HRSAB	1,640	
Heating HRSAB	2,624	
C/H HRSAB	4,276	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4325
System Type 12
System Name: BASEBOARD RADIATION
System Number: HX-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,013.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	552.8	
Sub Total	0.0	4,300.8	552.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	143.9	
HW OA Reset	0.0	0.0	15.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,300.8	712.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4325

Building Sq.Ft.: 21,720

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	3445
CFM - CLG	0
% OA	25.30%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4325
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,815.4	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	552.1	
Sub Total	0.0	8,103.0	552.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	143.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,103.0	695.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4325

Building Sq.Ft.: 21,720

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2400
CFM - CLG	0
% OA	100.00%
% Area	16.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4325
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	386.5	
Sub Total	0.0	6,850.0	386.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	100.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	6,850.0	487.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4325

Building Sq.Ft.: 21,720

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV-3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2359
CFM - CLG	0
% OA	25.30%
% Area	16.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4325

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	379.6	
Sub Total	0.0	6,850.0	379.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	6,850.0	478.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4325

Building Sq.Ft.: 21,720

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV-4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2359
CFM - CLG	0
% OA	25.30%
% Area	16.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4325
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	379.6	
Sub Total	0.0	6,850.0	379.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	6,850.0	478.4	3

ENERGY CALCULATIONS

BUILDING 4330

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4330

Building Sq.Ft.: 12,968

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	2100	2100	2100	2100	2100	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	30
Load Factor	0.8
CFM - HTG	19145
CFM - CLG	0
% OA	10.00%
% Area	82.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.20% 90.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,080	3,360
Heating HRSON	3,328	5,376
C/H HRSON	5,423	8,760
Cooling HRSAB	1,280	
Heating HRSAB	2,048	
C/H HRSAB	3,337	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 4330

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	40,629.4	0.0	
Optimum ST/SP	0.0	3,729.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	60.6	
Sub Total	0.0	44,359.1	60.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	105.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	44,359.1	166.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4330

Building Sq.Ft.: 12,968

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: B1

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	2100	2100	2100	2100	2100	1700

Present Operations	S	M	T	W	TH	F	S
Start Time		0	0	0	0	0	0
Stop Time		2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	18.00%
TON CAPC.	0
MBTU CAPC.	0.95
kW/Ton	0
MOSON	7
EFF	0.82
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,080	2,880
Heating HRSON	3,328	4,608
C/H HRSON	5,423	7,509
Cooling HRSAB	800	
Heating HRSAB	1,280	
C/H HRSAB	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 4330
System Type: 10
System Name: HOT WATER BOILER AND PUMPS
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,865.8	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	13.3	
Sub Total	0.0	4,433.6	13.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	23.2	
HW OA Reset	0.0	0.0	8.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,433.6	45.1	3

ENERGY CALCULATIONS

BUILDING 4350

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4350

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	220.0	
Sub Total	0.0	12,801.7	220.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,801.7	299.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.30%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 4350
System Type 2
System Name: H&V UNIT
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	12,575.6	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	212.5	
Sub Total	0.0	13,655.2	212.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	76.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	13,655.2	289.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 2

System Name: H&V UNIT

System Number: AHU3

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 4350
System Type 2
System Name: H&V UNIT
System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,224.8	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	187.5	
Sub Total	0.0	16,531.8	187.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	67.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	16,531.8	255.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 2

System Name: H&V UNIT

System Number: AHU4

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAH	0.00	0.00
HOAHU	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4350

System Type 2

System Name: H&V UNIT

System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	22,600.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	300.0	
Sub Total	0.0	24,540.3	300.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	108.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	24,540.3	408.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 2

System Name: H&V UNIT

System Number: AHU5

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4350
System Type 2
System Name: H&V UNIT
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	9,605.1	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	125.0	
Sub Total	0.0	10,429.6	125.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	10,429.6	170.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4350
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	20.0	
Sub Total	0.0	7,181.9	20.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	7,181.9	27.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4350

Building Sq.Ft.: 13,310

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAHU	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 4350
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,055.6	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	92.5	
Sub Total	0.0	2,343.1	92.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	33.4	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,343.1	137.1	3

ENERGY CALCULATIONS

BUILDING 4400

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4400

Building Sq.Ft.: 13,712

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4400

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	179.9	
Sub Total	0.0	8,501.7	179.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	193.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4400

Building Sq.Ft.: 13,712

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4400
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	34.3	
Sub Total	0.0	4,791.4	34.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	36.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4400

Building Sq.Ft.: 13,712

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 4400

System Type: 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4400

Building Sq.Ft.: 13,712

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4400
System Type: 12
System Name: BASEBOARD RADIATION
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	642.4	
Sub Total	0.0	2,397.8	642.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	49.8	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	693.0	3

ENERGY CALCULATIONS

BUILDING 4405

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4405

Building Sq.Ft.: 2,372

System Type 2

System Name: H&V UNIT

System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
24	BRICK	CHAPEL ZONE	0800-1400	SUN

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	0	900	0	900	0	0
Stop Time	1300	0	1200	0	1200	0	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	17.5
Load Factor	0.8
CFM - HTG	3216
CFM - CLG	0
% OA	48.78%
% Area	58.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	340	3,360
Heating HRSON	544	5,376
C/H HRSON	886	8,760
Cooling HRS AV	3,020	
Heating HRS AV	4,832	
C/H HRS AV	7,874	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	372.76	372.76
HOAOHC	185.87	185.87
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	7.01E+03	7.01E+03
NSC	2.51E+05	2.51E+05
FV	147	147
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 4405

System Type: 2

System Name: H&V UNIT

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	94,795.3	0.0	
Optimum ST/SP	0.0	2,263.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	345.9	
Sub Total	0.0	97,058.7	345.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	22.1	
DDC Control	0.0	0.0	9.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	97,058.7	377.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4405

Building Sq.Ft.: 7,048

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	0
Stop Time	1300	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	2900
CFM - CLG	0
% OA	31.03%
% Area	77.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,480	3,360
Heating HRSON	2,368	5,376
C/H HRSON	3,859	8,760
Cooling HRSAB	1,880	
Heating HRSAB	3,008	
C/H HRSAB	4,901	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 4405
System Type: 2
System Name: H&V UNIT
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	50,581.4	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	178.9	
Sub Total	0.0	52,521.5	178.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	9.0	
DDC Control	0.0	0.0	68.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	52,521.5	256.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4405

Building Sq.Ft.: 7,048

System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1300	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.505
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,580	3,360
Heating HRSON	4,128	5,376
C/H HRSON	6,726	8,760
Cooling HRSAB	780	
Heating HRSAB	1,248	
C/H HRSAB	2,034	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 4405
System Type 10
System Name: HOT WATER BOILER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.7	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	3.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4405

Building Sq.Ft.: 7,048

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	0
Stop Time	1300	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	28.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,480	3,360
Heating HRSON	2,368	5,376
C/H HRSON	3,859	8,760
Cooling HRSAB	1,880	
Heating HRSAB	3,008	
C/H HRSAB	4,901	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number:

4405

System Type

12

System Name:

BASEBOARD RADIATION

System Number:

FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,600.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	66.2	
Sub Total	0.0	4,888.1	66.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	25.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,888.1	91.5	3

ENERGY CALCULATIONS

BUILDING 4410

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4410

Building Sq.Ft.: 12,838

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4410
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	168.4	
Sub Total	0.0	8,501.7	168.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	181.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4410

Building Sq.Ft.: 12,838

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4410
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	32.1	
Sub Total	0.0	4,791.4	32.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	34.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4410

Building Sq.Ft.: 12,838

System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 4410

System Type: 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4410

Building Sq.Ft.: 12,838

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4410
System Type 12
System Name: BASEBOARD RADIATION
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	601.4	
Sub Total	0.0	2,397.8	601.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	46.6	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	648.9	3

ENERGY CALCULATIONS

BUILDING 4412

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4,412

Building Sq.Ft.: 51,280

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 4,412
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	3.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4,412

Building Sq.Ft.: 51,280

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 4,412
System Type 12
System Name: BASEBOARD RADIATION
System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	7.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	14
System Name:	VENTILATION
System Number:	AHU1

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 4412

System Type 14

System Name: VENTILATION

System Number: AHU1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,092.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 14

System Name: VENTILATION

System Number: AHU2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 4412
System Type 14
System Name: VENTILATION
System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,092.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 14

System Name: VENTILATION

System Number: AHU-3

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4566
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95
PAGE 2 OF 2

Bldg Number: 4412
System Type 14
System Name: VENTILATION
System Number: AHU-3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 14
 System Name: VENTILATION
 System Number: AHU-4

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4779
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95
PAGE 2 OF 2

Bldg Number: 4412
System Type 14
System Name: VENTILATION
System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 4412

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	108.1	
Sub Total	0.0	1,683.3	108.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	121.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 4412
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	108.1	
Sub Total	0.0	1,683.3	108.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	121.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU8

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 4412

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	108.1	
Sub Total	0.0	1,683.3	108.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	121.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 17,435

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 4412

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	108.1	
Sub Total	0.0	1,683.3	108.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	121.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 33,845

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU10

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 4412
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	79.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4412

Building Sq.Ft.: 33,845

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU11

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

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Bldg Number: 4412

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	79.2	3

ENERGY CALCULATIONS

BUILDING 4414

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4,414

Building Sq.Ft.: 35,198

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 4,414
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	2.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4,414

Building Sq.Ft.: 35,198

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 4,414
System Type 12
System Name: BASEBOARD RADIATION
System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	4.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4414

Building Sq.Ft.: 8,800

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

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Bldg Number: 4414

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	72.8	
Sub Total	0.0	1,683.3	72.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	81.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4414

Building Sq.Ft.: 8,800

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 4414
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	72.8	
Sub Total	0.0	1,683.3	72.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	81.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4414

Building Sq.Ft.: 8,800

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 4414
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	72.8	
Sub Total	0.0	1,683.3	72.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	81.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4414

Building Sq.Ft.: 26,399

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

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Bldg Number: 4414

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	62.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	62.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4414

Building Sq.Ft.: 26,399

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

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Bldg Number: 4414

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	62.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	62.9	3

ENERGY CALCULATIONS

BUILDING 4420

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4420

Building Sq.Ft.:

13,007

System Type

1

System Name:

H&V UNIT WITHOUT RETURN FAN

System Number:

AHU1

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

09-Apr-95

PAGE 2 OF 2

Bldg Number: 4420

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	170.6	
Sub Total	0.0	8,501.7	170.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	183.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4420

Building Sq.Ft.: 13,007

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 09-Apr-95
PAGE 2 OF 2

Bldg Number: 4420
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	32.5	
Sub Total	0.0	4,791.4	32.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	35.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4420

Building Sq.Ft.: 13,007

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

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Bldg Number: 4420

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4420

Building Sq.Ft.:

13,007

System Type

12

System Name:

BASEBOARD RADIATION

System Number:

HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 4420

System Type: 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	609.4	
Sub Total	0.0	2,397.8	609.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	47.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	657.4	3

ENERGY CALCULATIONS

BUILDING 4422

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4422

Building Sq.Ft.: 34,190

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.283
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4422

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	2.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4422

Building Sq.Ft.: 34,190

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV2

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 4422
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	80.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4422

Building Sq.Ft.: 34,190

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 4422
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	80.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4422

Building Sq.Ft.: 34,190

System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	54.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 4422
System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	258.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	258.8	3

ENERGY CALCULATIONS

BUILDING 4430

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4430

Building Sq.Ft.: 12,451

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 09-Apr-95
PAGE 2 OF 2

Bldg Number: 4430

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
Sub Total	0.0	8,501.7	163.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	176.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4430

Building Sq.Ft.: 12,451

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

09-Apr-95

PAGE 2 OF 2

Bldg Number: 4430

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
Sub Total	0.0	4,791.4	31.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	33.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4430

Building Sq.Ft.: 12,451

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4430
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4430

Building Sq.Ft.: 12,451

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 4430

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
Sub Total	0.0	2,397.8	583.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	629.4	3

ENERGY CALCULATIONS

BUILDING 4432

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4432

Building Sq.Ft.: 35,294

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.283
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4432

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	2.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4432

Building Sq.Ft.: 35,294

System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	54.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 4432

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	267.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	267.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4432

Building Sq.Ft.: 35,294

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 4432
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	82.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	82.6	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4432

Building Sq.Ft.: 35,294

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: HV2

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 4432

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	82.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	82.6	3

ENERGY CALCULATIONS

BUILDING 4450

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4450

Building Sq.Ft.: 12,730

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4450

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
Sub Total	0.0	12,801.7	174.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,801.7	237.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4450

Building Sq.Ft.: 12,730

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4450

System Type: 2

System Name: H&V UNIT

System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	203.2	
Sub Total	0.0	15,122.3	203.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	73.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,122.3	276.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4450

Building Sq.Ft.: 12,730

System Type 2

System Name: H&V UNIT

System Number: AHU3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4450

System Type: 2

System Name: H&V UNIT

System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	179.3	
Sub Total	0.0	18,308.0	179.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	64.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	18,308.0	244.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4450

Building Sq.Ft.: 12,730

System Type: 2

System Name: H&V UNIT

System Number: AHU4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4450

System Type 2

System Name: H&V UNIT

System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	286.9	
Sub Total	0.0	27,177.0	286.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	103.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	27,177.0	390.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4450

Building Sq.Ft.: 12,730

System Type 2

System Name: H&V UNIT

System Number: AHU5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 4450
System Type 2
System Name: H&V UNIT
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	119.5	
Sub Total	0.0	11,550.2	119.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	43.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	11,550.2	162.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4450

Building Sq.Ft.: 12,730

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 4450
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	19.1	
Sub Total	0.0	7,181.9	19.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	7,181.9	26.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4450

Building Sq.Ft.: 12,730

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 4450

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	88.5	
Sub Total	0.0	3,637.0	88.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	32.0	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	3,637.0	131.6	3

ENERGY CALCULATIONS

BUILDING 4475

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	18.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 4475
System Type: 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	81.2	
Sub Total	0.0	83,884.9	81.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	20.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	101.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	18.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 4475

System Type 2

System Name: H&V UNIT

System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	81.2	
Sub Total	0.0	101,035.1	81.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	20.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	101,035.1	101.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	18.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4475

System Type: 2

System Name: H&V UNIT

System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	81.2	
Sub Total	0.0	83,884.9	81.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	20.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	101.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	18.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUH	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 4475
System Type 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	40.6	
Sub Total	0.0	83,884.9	40.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	51.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 4475

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	48.7	
Sub Total	0.0	56,826.3	48.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	61.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 4475
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.4	
Sub Total	0.0	56,826.3	24.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	30.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 4475
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	48.7	
Sub Total	0.0	56,826.3	48.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	61.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCM/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	2000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4475

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	48.7	
Sub Total	0.0	56,826.3	48.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	61.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

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Bldg Number: 4475

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.4	
Sub Total	0.0	56,826.3	24.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	30.6	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 4475
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	40.6	
Sub Total	0.0	56,826.3	40.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	51.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-7

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	6840
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 4475
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	16.2	
Sub Total	0.0	56,826.3	16.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	20.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 12
System Name: BASEBOARD RADIATION
System Number: HTP1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 4475
System Type 12
System Name: BASEBOARD RADIATION
System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	194.8	
Sub Total	0.0	12,616.7	194.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	49.8	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	271.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HTP2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 4475

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	34.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4475

Building Sq.Ft.: 87,687

System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HTP3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 4475
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	31.5	3

ENERGY CALCULATIONS

BUILDING 4485

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4485

Building Sq.Ft.: 37,717

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type: 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	34.9	
Sub Total	0.0	83,884.9	34.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	43.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 4485
System Type 2
System Name: H&V UNIT
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	34.9	
Sub Total	0.0	101,035.1	34.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	101,035.1	43.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4485

Building Sq.Ft.: 37,717

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	34.9	
Sub Total	0.0	83,884.9	34.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	43.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	17.5	
Sub Total	0.0	83,884.9	17.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	21.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	21.0	
Sub Total	0.0	56,826.3	21.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	26.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	10.5	
Sub Total	0.0	56,826.3	10.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	13.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4485

Building Sq.Ft.: 37,717

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	21.0	
Sub Total	0.0	56,826.3	21.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	26.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	21.0	
Sub Total	0.0	56,826.3	21.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	26.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-5

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4485
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	10.5	
Sub Total	0.0	56,826.3	10.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	13.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4485

Building Sq.Ft.: 37,717

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	17.5	
Sub Total	0.0	56,826.3	17.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	21.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-7

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4485

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.0	
Sub Total	0.0	29,644.0	7.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	29,644.0	8.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4485

Building Sq.Ft.: 37,717

System Type 12
System Name: BASEBOARD RADIATION
System Number: HTP1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4485

System Type: 12

System Name: BASEBOARD RADIATION

System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	83.8	
Sub Total	0.0	12,616.7	83.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	21.4	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	131.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4485
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	34.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4485

Building Sq.Ft.: 37,717

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HTP2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4485

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	34.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4485

Building Sq.Ft.: 37,717

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4485

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	31.5	3

ENERGY CALCULATIONS

BUILDING 4486

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 4486
System Type 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.7	
Sub Total	0.0	83,884.9	25.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	32.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4486

Building Sq.Ft.: 27,723

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	20.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 4486
System Type: 2
System Name: H&V UNIT
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.7	
Sub Total	0.0	101,035.1	25.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	101,035.1	32.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4486

Building Sq.Ft.: 27,733

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 4486
System Type: 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.7	
Sub Total	0.0	83,884.9	25.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	32.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4486

Building Sq.Ft.: 27,733

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 10-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 10-Apr-95

PAGE 2 OF 2

Bldg Number: 4486
System Type 2
System Name: H&V UNIT
System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.8	
Sub Total	0.0	83,884.9	12.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	16.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4486

Building Sq.Ft.: 27,733

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4486
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.4	
Sub Total	0.0	56,826.3	15.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	19.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4486
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.7	
Sub Total	0.0	56,826.3	7.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	9.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

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Bldg Number: 4486

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.4	
Sub Total	0.0	56,826.3	15.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	19.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4486
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.4	
Sub Total	0.0	56,826.3	15.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	19.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-5

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4486
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.7	
Sub Total	0.0	56,826.3	7.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	9.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4486
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.8	
Sub Total	0.0	56,826.3	12.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	16.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-7

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

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Bldg Number: 4486

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	5.1	
Sub Total	0.0	29,644.0	5.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	29,644.0	6.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.:

27,733

System Type

12

System Name:

BASEBOARD RADIATION

System Number:

HTP1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4486
System Type 12
System Name: BASEBOARD RADIATION
System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	61.6	
Sub Total	0.0	12,616.7	61.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.7	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	103.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 4486

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	34.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

4486

Building Sq.Ft.: 27,733

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HTP3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 4486
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	31.5	3

ENERGY CALCULATIONS

BUILDING 4525

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 2

System Name: H&V UNIT

System Number: AHU1

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	7475
CFM - CLG	14600
% OA	31.70%
% Area	22.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525
System Type: 2
System Name: H&V UNIT
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	230.4	
Sub Total	0.0	19,363.7	230.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	58.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	289.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	5000
CFM - CLG	9700
% OA	29.58%
% Area	14.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95
PAGE 2 OF 2

Bldg Number: 4525
System Type 2
System Name: H&V UNIT
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,433.0	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	151.9	
Sub Total	0.0	16,000.8	151.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	38.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	16,000.8	190.6	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 2

System Name: H&V UNIT

System Number: AHU3

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	3300
CFM - CLG	6600
% OA	7.29%
% Area	3.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525
System Type 2
System Name: H&V UNIT
System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,433.0	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	35.6	
Sub Total	0.0	16,000.8	35.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	16,000.8	44.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	2600
% OA	7.23%
% Area	0.67%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95
PAGE 2 OF 2

Bldg Number: 4525
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,815.4	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.0	
Sub Total	0.0	8,103.0	7.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,103.0	8.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	1000
CFM - CLG	2000
% OA	7.23%
% Area	0.52%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	5.4	
Sub Total	0.0	6,850.0	5.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	6,850.0	6.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	900
CFM - CLG	1800
% OA	7.23%
% Area	0.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	4.2	
Sub Total	0.0	6,850.0	4.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	6,850.0	5.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	1600
CFM - CLG	3200
% OA	13.30%
% Area	1.35%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95
PAGE 2 OF 2

Bldg Number: 4525
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,574.7	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.1	
Sub Total	0.0	12,000.6	14.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,000.6	17.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU1

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	2000
CFM - CLG	2000
% OA	100.00%
% Area	5.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,676.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	57.6	
Sub Total	0.0	19,363.7	57.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	19,363.7	72.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU1

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1200
CFM - CLG	1200
% OA	100.00%
% Area	3.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95
PAGE 2 OF 2

Bldg Number: 4525
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,344.6	0.0	
Optimum ST/SP	0.0	86.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	34.6	
Sub Total	0.0	2,430.9	34.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,430.9	43.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.3454
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	10.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	10.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE2

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.1966
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

17-Apr-95

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Bldg Number: 4525

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	8.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	8.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE3

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.905
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	6.7	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	6.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4525

Building Sq.Ft.: 113,120

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE4

EMC NO.: 1406-006

DATE: 17-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.1335
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 4525
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE4

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	8.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	8.4	3

ENERGY CALCULATIONS

BUILDING 4530

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 4
System Name: SINGLE ZONE AHU
System Number: AC1

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	6000
CFM - CLG	6000
% OA	14.67%
% Area	0.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

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Bldg Number: 4530

System Type 4

System Name: SINGLE ZONE AHU

System Number: AC1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,663.1	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	2.6	0.0	0.0	
Night Setback	0.0	0.0	110.5	
Sub Total	2.6	5,906.2	110.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	2.6	5,906.2	118.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 4

System Name: SINGLE ZONE AHU

System Number: AC2

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	6000
CFM - CLG	6000
% OA	100.00%
% Area	2.91%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

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Bldg Number: 4530

System Type 4

System Name: SINGLE ZONE AHU

System Number: AC2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,663.1	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	2.6	0.0	0.0	
Night Setback	0.0	0.0	459.5	
Sub Total	2.6	5,906.2	459.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	32.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	2.6	5,906.2	492.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 4

System Name: SINGLE ZONE AHU

System Number: AC3

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	2500
CFM - CLG	2500
% OA	36.00%
% Area	0.54%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 18-Apr-95

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Bldg Number: 4530

System Type 4

System Name: SINGLE ZONE AHU

System Number: AC3

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,009.7	0.0	
Optimum ST/SP	0.0	86.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.9	0.0	0.0	
Night Setback	0.0	0.0	85.3	
Sub Total	0.9	2,095.9	85.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.9	2,095.9	91.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 11

System Name: CONDENSING UNIT

System Number: ACC1

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	15
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type 11
System Name: CONDENSING UNIT
System Number: ACC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	143.6	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	143.6	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 11

System Name: CONDENSING UNIT

System Number: ACC2

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCM/LC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	27.0833
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type 11
System Name: CONDENSING UNIT
System Number: ACC2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	259.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	259.2	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 11
System Name: CONDENSING UNIT
System Number: ACC3

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	6.666667
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type 11
System Name: CONDENSING UNIT
System Number: ACC3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	63.8	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	63.8	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP-1

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	22.4
kW/Ton	0
MOSON	7
EFF	1

LOOK-UP VALUE

EFFHP	91.70%	91.70%
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HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,660	3,360
Heating HRSON	4,256	5,376
C/H HRSON	6,935	8,760
Cooling HRSAB	700	
Heating HRSAB	1,120	
C/H HRSAB	1,825	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,639.4	0.0	
Optimum ST/SP	0.0	9,171.6	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	947.4	
Sub Total	0.0	63,811.0	947.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	67.6	
HW OA Reset	0.0	0.0	165.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	63,811.0	1,180.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	45
Load Factor	0.8
CFM - HTG	23765
CFM - CLG	47530
% OA	19.40%
% Area	1.64%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.60% 90.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAV	1,680	
Heating HRSAV	2,688	
C/H HRSAV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 18-Apr-95
PAGE 2 OF 2

Bldg Number: 4530
System Type 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	129,764.0	0.0	
Optimum ST/SP	0.0	5,569.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	259.0	
Sub Total	0.0	135,333.8	259.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	18.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	135,333.8	277.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	45
Load Factor	0.8
CFM - HTG	30170
CFM - CLG	59540
% OA	74.60%
% Area	8.03%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.60% 90.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type 2
System Name: H&V UNIT
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	129,764.0	0.0	
Optimum ST/SP	0.0	5,569.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,268.0	
Sub Total	0.0	135,333.8	1,268.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	90.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	135,333.8	1,358.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	45
Load Factor	0.8
CFM - HTG	24090
CFM - CLG	48140
% OA	74.60%
% Area	2.91%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.60% 90.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

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Bldg Number: 4530
System Type 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	129,764.0	0.0	
Optimum ST/SP	0.0	5,569.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	459.5	
Sub Total	0.0	135,333.8	459.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	32.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	135,333.8	492.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU1

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	40
Load Factor	0.8
CFM - HTG	43380
CFM - CLG	43380
% OA	100.00%
% Area	15.78%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.60% 90.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAV	1,680	
Heating HRSAV	2,688	
C/H HRSAV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	115,345.8	0.0	
Optimum ST/SP	0.0	4,950.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	2,491.8	
Sub Total	0.0	120,296.7	2,491.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	177.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	120,296.7	2,669.6	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU2

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	40
Load Factor	0.8
CFM - HTG	43380
CFM - CLG	43380
% OA	100.00%
% Area	15.78%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.60% 90.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	115,345.8	0.0	
Optimum ST/SP	0.0	4,950.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	2,491.8	
Sub Total	0.0	120,296.7	2,491.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	177.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	120,296.7	2,669.6	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU3

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	30
Load Factor	0.8
CFM - HTG	30360
CFM - CLG	30360
% OA	100.00%
% Area	11.08%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.20% 90.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 18-Apr-95

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Bldg Number: 4530

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	86,893.0	0.0	
Optimum ST/SP	0.0	3,729.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,749.6	
Sub Total	0.0	90,622.6	1,749.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	124.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	90,622.6	1,874.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU4

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	14700
CFM - CLG	14700
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	1,400
Heating HRSON	2,688	2,240
C/H HRSON	4,380	3,650
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU5

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	5400
CFM - CLG	5400
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	1,400
Heating HRSON	2,688	2,240
C/H HRSON	4,380	3,650
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

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Bldg Number: 4530

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU6

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

INPUTS	INPUT
Motor HP	40
Load Factor	0.8
CFM - HTG	40680
CFM - CLG	40680
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.60% 90.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	1,400
Heating HRSON	2,688	2,240
C/H HRSON	4,380	3,650
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

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Bldg Number: 4530

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU7

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1540
CFM - CLG	1540
% OA	100.00%
% Area	0.06%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,009.7	0.0	
Optimum ST/SP	0.0	86.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	9.5	
Sub Total	0.0	2,095.9	9.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,095.9	10.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU8

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

INPUTS	INPUT
Motor HP	20
Load Factor	0.8
CFM - HTG	28000
CFM - CLG	28000
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	1,400
Heating HRSON	2,688	2,240
C/H HRSON	4,380	3,650
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	245.00	245.00
HOAOHC	150.00	150.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.76E+03	5.76E+03
NSC	8.07E+04	8.07E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

PAGE 2 OF 2

Bldg Number: 4530
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 4530

Building Sq.Ft.: 195,670

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU9

EMC NO.: 1406-006

DATE: 18-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
9	BRICK	SMA BUILDING	0730-1630	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	1700

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	7000
CFM - CLG	7000
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	1,400
Heating HRSON	2,688	2,240
C/H HRSON	4,380	3,650
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	261.93	261.93
HOAOHC	160.74	160.74
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.19E+03	5.19E+03
NSC	1.59E+05	1.59E+05
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

18-Apr-95

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Bldg Number: 4530

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	0.0	3

ENERGY CALCULATIONS

BUILDING 10000

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	1125
CFM - CLG	1125
% OA	29.20%
% Area	0.83%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	0
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,418.6	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.7	0.0	0.0	
Night Setback	0.0	0.0	39.8	
Sub Total	1.7	4,580.7	39.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.5	0.3	
DDC Control	0.0	0.0	5.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.7	4,581.2	45.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-2

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1340
CFM - CLG	1340
% OA	29.20%
% Area	1.20%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 10000
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,832.1	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	3.1	0.0	0.0	
Night Setback	0.0	0.0	57.5	
Sub Total	3.1	8,119.6	57.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.6	0.4	
DDC Control	0.0	0.0	8.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	3.1	8,120.2	66.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-3

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	2910
CFM - CLG	2910
% OA	29.20%
% Area	1.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-3

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,851.6	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	3.1	0.0	0.0	
Night Setback	0.0	0.0	86.2	
Sub Total	3.1	8,139.1	86.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	1.3	0.8	
DDC Control	0.0	0.0	12.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	3.1	8,140.4	99.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-4

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2575
CFM - CLG	2575
% OA	29.20%
% Area	1.90%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-4

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,638.9	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	2.6	0.0	0.0	
Night Setback	0.0	0.0	91.0	
Sub Total	2.6	6,882.0	91.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	1.2	0.7	
DDC Control	0.0	0.0	13.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	2.6	6,883.2	105.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-5

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	585
CFM - CLG	585
% OA	29.20%
% Area	0.35%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-5

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,554.7	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.6	0.0	0.0	
Night Setback	0.0	0.0	16.8	
Sub Total	0.6	1,611.6	16.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.3	0.2	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.6	1,611.9	19.4	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-6

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.125
Load Factor	0.8
CFM - HTG	410
CFM - CLG	410
% OA	29.20%
% Area	0.10%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 10000
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-6

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	591.2	0.0	
Optimum ST/SP	0.0	21.6	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.2	0.0	0.0	
Night Setback	0.0	0.0	4.6	
Sub Total	0.2	612.8	4.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.2	0.1	
DDC Control	0.0	0.0	0.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.2	613.0	5.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-7

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	410
CFM - CLG	410
% OA	29.20%
% Area	1.06%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-7

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,522.0	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	50.8	
Sub Total	1.4	3,651.4	50.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.2	0.1	
DDC Control	0.0	0.0	7.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	3,651.6	58.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-8

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	860
CFM - CLG	860
% OA	29.20%
% Area	0.86%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 10000
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-8

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,558.1	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.6	0.0	0.0	
Night Setback	0.0	0.0	41.2	
Sub Total	0.6	1,615.1	41.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.4	0.2	
DDC Control	0.0	0.0	6.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.6	1,615.5	47.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-9

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	860
CFM - CLG	860
% OA	29.20%
% Area	0.56%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-9

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,558.1	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.6	0.0	0.0	
Night Setback	0.0	0.0	26.8	
Sub Total	0.6	1,615.1	26.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.4	0.2	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.6	1,615.5	31.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-10

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	860
CFM - CLG	860
% OA	29.20%
% Area	0.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95
PAGE 2 OF 2

Bldg Number: 10000
System Type 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-10

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,558.1	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.6	0.0	0.0	
Night Setback	0.0	0.0	36.0	
Sub Total	0.6	1,615.1	36.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.4	0.2	
DDC Control	0.0	0.0	5.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.6	1,615.5	41.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-11

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.25
Load Factor	0.8
CFM - HTG	500
CFM - CLG	500
% OA	29.20%
% Area	0.46%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-11

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,178.5	0.0	
Optimum ST/SP	0.0	43.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.5	0.0	0.0	
Night Setback	0.0	0.0	22.1	
Sub Total	0.5	1,221.7	22.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.2	0.1	
DDC Control	0.0	0.0	3.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.5	1,221.9	25.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 3
System Name: SINGLE ZONE AHU WITHOUT RETURN FAN
System Number: AHU-12

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.25
Load Factor	0.8
CFM - HTG	1150
CFM - CLG	1150
% OA	29.20%
% Area	3.41%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-12

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,186.6	0.0	
Optimum ST/SP	0.0	43.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.5	0.0	0.0	
Night Setback	0.0	0.0	163.4	
Sub Total	0.5	1,229.7	163.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.5	0.3	
DDC Control	0.0	0.0	23.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.5	1,230.2	187.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-13

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.25
Load Factor	0.8
CFM - HTG	1150
CFM - CLG	1150
% OA	29.20%
% Area	3.41%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 3

System Name: SINGLE ZONE AHU WITHOUT RETURN FAN

System Number: AHU-13

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,186.6	0.0	
Optimum ST/SP	0.0	43.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.5	0.0	0.0	
Night Setback	0.0	0.0	163.4	
Sub Total	0.5	1,229.7	163.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.5	0.3	
DDC Control	0.0	0.0	23.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.5	1,230.2	187.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-14

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4400
CFM - CLG	0
% OA	100.00%
% Area	16.20%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-14

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,574.7	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	776.1	
Sub Total	0.0	12,000.6	776.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	113.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,000.6	889.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-15

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	2550
CFM - CLG	0
% OA	100.00%
% Area	10.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

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Bldg Number: 10000

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-15

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,404.6	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	493.5	
Sub Total	0.0	4,566.7	493.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	72.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,566.7	565.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-16

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1610
CFM - CLG	0
% OA	100.00%
% Area	6.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-16

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,344.6	0.0	
Optimum ST/SP	0.0	86.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	311.4	
Sub Total	0.0	2,430.9	311.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,430.9	356.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 14
System Name: VENTILATION
System Number: SF-1

EMC NO.: 1406-006

DATE: 13-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	2750
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	0.00E+00
COAUHC	8.32E-06	0.00E+00
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

13-Apr-95

PAGE 2 OF 2

Bldg Number: 10000
System Type 14
System Name: VENTILATION
System Number: SF-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,534.2	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	2,777.3	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	2,777.3	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 14

System Name: VENTILATION

System Number: SF-2

EMC NO.: 1406-006

DATE: 13-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	2750
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	0.00E+00
COAUHC	8.32E-06	0.00E+00
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

13-Apr-95

PAGE 2 OF 2

Bldg Number: 10000
System Type 14
System Name: VENTILATION
System Number: SF-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,534.2	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	2,777.3	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	2,777.3	0.0	0

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 14

System Name: VENTILATION

System Number: SF-3

EMC NO.: 1406-006

DATE: 13-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	2750
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	0.00E+00
COAUHC	8.32E-06	0.00E+00
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 13-Apr-95
PAGE 2 OF 2

Bldg Number: 10000
System Type: 14
System Name: VENTILATION
System Number: SF-3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,534.2	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	2,777.3	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	2,777.3	0.0	0

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 14

System Name: VENTILATION

System Number: SF-4

EMC NO.: 1406-006

DATE: 13-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4750
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	0.00E+00
COAUHC	8.32E-06	0.00E+00
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

13-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 14

System Name: VENTILATION

System Number: SF-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,997.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	3,285.2	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	3,285.2	0.0	0

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 14

System Name: VENTILATION

System Number: SF-31

EMC NO.: 1406-006

DATE: 13-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4750
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	0.00E+00
COAUHC	8.32E-06	0.00E+00
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

13-Apr-95

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Bldg Number: 10000

System Type 14

System Name: VENTILATION

System Number: SF-31

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,997.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	3,285.2	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	3,285.2	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	FTR-1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1200	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	32.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,560	3,360
Heating HRSON	4,096	5,376
C/H HRSON	6,674	8,760
Cooling HRSAB	800	
Heating HRSAB	1,280	
C/H HRSAB	2,086	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000
System Type 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,678.3	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1,533.1	
Sub Total	0.0	5,365.4	1,533.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	223.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,365.4	1,756.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.372
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	0	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	10.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	10.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE2

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.108
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	0	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	8.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	8.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 8

System Name: CHILLER AND PUMPS

System Number: CH-1

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	30
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000
System Type: 8
System Name: CHILLER AND PUMPS
System Number: CH-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	287.1	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	287.1	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10000

Building Sq.Ft.: 80,294

System Type 8

System Name: CHILLER AND PUMPS

System Number: CH-2

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDIN	600-1800	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	30
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 10000
System Type: 8
System Name: CHILLER AND PUMPS
System Number: CH-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	1.4	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	1.4	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	287.1	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	1.4	287.1	0.0	3

ENERGY CALCULATIONS

BUILDING 10030

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10030

Building Sq.Ft.: 2,372

System Type 2

System Name: H&V UNIT

System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
24	BRICK	CHAPEL ZONE	0800-1400	SUN

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	0	900	0	900	0	0
Stop Time	1300	0	1200	0	1200	0	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	17.5
Load Factor	0.8
CFM - HTG	3216
CFM - CLG	0
% OA	48.78%
% Area	58.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	340	3,360
Heating HRSON	544	5,376
C/H HRSON	886	8,760
Cooling HRS AV	3,020	
Heating HRS AV	4,832	
C/H HRS AV	7,874	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	372.76	372.76
HOAOHC	185.87	185.87
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	7.01E+03	7.01E+03
NSC	2.51E+05	2.51E+05
FV	147	147
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 10030
System Type 2
System Name: H&V UNIT
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	94,795.3	0.0	
Optimum ST/SP	0.0	2,263.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	345.9	
Sub Total	0.0	97,058.7	345.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	22.1	
DDC Control	0.0	0.0	9.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	97,058.7	377.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10030

Building Sq.Ft.: 7,048

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	0
Stop Time	1300	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	2900
CFM - CLG	0
% OA	31.03%
% Area	77.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,480	3,360
Heating HRSON	2,368	5,376
C/H HRSON	3,859	8,760
Cooling HRS AV	1,880	
Heating HRS AV	3,008	
C/H HRS AV	4,901	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10030
System Type 2
System Name: H&V UNIT
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	50,581.4	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	178.9	
Sub Total	0.0	52,521.5	178.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	9.0	
DDC Control	0.0	0.0	68.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	52,521.5	256.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10030

Building Sq.Ft.: 7,048

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	1300	1800	1800	1800	1800	1800	1200

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.505
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,580	3,360
Heating HRSON	4,128	5,376
C/H HRSON	6,726	8,760
Cooling HRSAB	780	
Heating HRSAB	1,248	
C/H HRSAB	2,034	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10030

System Type 10

System Name: HOT WATER BOILER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.7	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	3.7	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10030

Building Sq.Ft.: 7,048

System Type: 12
System Name: BASEBOARD RADIATION
System Number: FTR-1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	0
Stop Time	1300	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	28.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,480	3,360
Heating HRSON	2,368	5,376
C/H HRSON	3,859	8,760
Cooling HRSAB	1,880	
Heating HRSAB	3,008	
C/H HRSAB	4,901	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

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Bldg Number: 10030

System Type 12

System Name: BASEBOARD RADIATION

System Number: FTR-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,600.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	66.2	
Sub Total	0.0	4,888.1	66.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	25.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,888.1	91.5	3

ENERGY CALCULATIONS

BUILDING 10050

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20875
CFM - CLG	0
% OA	20.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	29,595.5	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	584.0	
Sub Total	0.0	31,535.6	584.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	105.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	31,535.6	689.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20875
CFM - CLG	0
% OA	20.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAV	1,100	
Heating HRSAV	1,760	
C/H HRSAV	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 10050
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	29,595.5	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	584.0	
Sub Total	0.0	31,535.6	584.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	105.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	31,535.6	689.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU3

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20875
CFM - CLG	0
% OA	20.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAV	1,100	
Heating HRSAV	1,760	
C/H HRSAV	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	29,595.5	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	584.0	
Sub Total	0.0	31,535.6	584.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	105.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	31,535.6	689.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20875
CFM - CLG	0
% OA	20.00%
% Area	14.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAV	1,100	
Heating HRSAV	1,760	
C/H HRSAV	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	29,595.5	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	584.0	
Sub Total	0.0	31,535.6	584.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	105.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	31,535.6	689.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	1100	1600	1700	1600	1700	1600	1100
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	6500
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAV	2,360	
Heating HRSAV	3,776	
C/H HRSAV	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	22,488.1	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	166.8	
Sub Total	0.0	23,175.2	166.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	30.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	23,175.2	197.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	1100	1600	1700	1600	1700	1600	1100
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	6500
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,000	3,360
Heating HRSON	1,600	5,376
C/H HRSON	2,607	8,760
Cooling HRSAB	2,360	
Heating HRSAB	3,776	
C/H HRSAB	6,153	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	22,488.1	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	166.8	
Sub Total	0.0	23,175.2	166.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	30.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	23,175.2	197.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	1100	1600	1700	1600	1700	2600	1100
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	2500
CFM - CLG	0
% OA	100.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	800	3,360
Heating HRSON	1,280	5,376
C/H HRSON	2,086	8,760
Cooling HRSAB	2,560	
Heating HRSAB	4,096	
C/H HRSAB	6,674	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,207.9	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	66.7	
Sub Total	0.0	10,495.4	66.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	10,495.4	78.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU8

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	9364
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 10050
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,438.8	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	250.3	
Sub Total	0.0	16,450.9	250.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	16,450.9	295.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4170
CFM - CLG	0
% OA	100.00%
% Area	2.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 10050
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,496.0	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	116.8	
Sub Total	0.0	6,921.9	116.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	21.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	6,921.9	137.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU10

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	12000
CFM - CLG	0
% OA	100.00%
% Area	8.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU10

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	19,937.3	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	333.7	
Sub Total	0.0	21,244.3	333.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	60.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	21,244.3	393.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU11

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	14200
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUC	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOC	126.26	126.26
HOAOC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU11

HEATING AND VENTILATING SYSTEMS:	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	19,937.3	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	375.4	
Sub Total	0.0	21,244.3	375.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	67.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	21,244.3	443.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU12

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	10500
CFM - CLG	0
% OA	100.00%
% Area	7.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAV	1,100	
Heating HRSAV	1,760	
C/H HRSAV	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

PAGE 2 OF 2

Bldg Number: 10050

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU12

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,438.8	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	292.0	
Sub Total	0.0	16,450.9	292.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	52.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	16,450.9	344.7	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0.563
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,432.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	66.7	
Sub Total	0.0	7,119.7	66.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.0	
HW OA Reset	0.0	0.0	4.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	7,119.7	82.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE2

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	600	600	600	600	600	800
Stop Time	2000	2100	2100	2100	2100	2100	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	98.40%
TON CAPC.	0
MBTU CAPC.	6.512
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,260	3,360
Heating HRSON	3,616	5,376
C/H HRSON	5,892	8,760
Cooling HRSAB	1,100	
Heating HRSAB	1,760	
C/H HRSAB	2,868	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95
PAGE 2 OF 2

Bldg Number: 10050
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,162.7	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	4,104.4	
Sub Total	0.0	20,102.8	4,104.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	740.7	
HW OA Reset	0.0	0.0	48.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	20,102.8	4,893.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10050

Building Sq.Ft.: 77,130

System Type 9

System Name: CONVERTER AND PUMPS for pool water

System Number: HE3

EMC NO.: 1406-006

DATE: 03-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
8	BRICK	PHYS FIT CENTER	0645-2000	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	900	1400	1500	1400	1500	1400	830
Stop Time	1900	1900	1900	1900	1900	1900	1900

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	1.065
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,154	3,360
Heating HRSON	1,846	5,376
C/H HRSON	3,009	8,760
Cooling HRSAV	2,206	
Heating HRSAV	3,530	
C/H HRSAV	5,751	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	126.26	126.26
HOAOHC	77.49	77.49
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.76E+03	9.76E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 03-Apr-95

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Bldg Number: 10050

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	24,537.7	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	25,844.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	25,844.7	7.9	3

ENERGY CALCULATIONS

BUILDING 10100

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10100

Building Sq.Ft.: 11,250

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 10100

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	147.6	
Sub Total	0.0	8,501.7	147.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	159.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10100

Building Sq.Ft.: 11,250

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 10100

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	28.1	
Sub Total	0.0	4,791.4	28.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	30.3	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10100

Building Sq.Ft.: 11,250

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 10100
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10100

Building Sq.Ft.: 11,250

System Type 12
System Name: BASEBOARD RADIATION
System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10100
System Type 12
System Name: BASEBOARD RADIATION
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	527.0	
Sub Total	0.0	2,397.8	527.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	40.9	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	568.7	3

ENERGY CALCULATIONS

BUILDING 10110

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10110

Building Sq.Ft.: 12,450

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 10-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

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Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 10-Apr-95

PAGE 2 OF 2

Bldg Number: 10110
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
Sub Total	0.0	8,501.7	163.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	176.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10110

Building Sq.Ft.: 12,450

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

EMC NO.: 1406-006

DATE: 10-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 10-Apr-95
PAGE 2 OF 2

Bldg Number: 10110
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
Sub Total	0.0	4,791.4	31.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	33.5	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10110

Building Sq.Ft.: 12,450

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10110
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10110

Building Sq.Ft.: 12,450

System Type: 12
System Name: BASEBOARD RADIATION
System Number: HE2

EMC NO.: 1406-006

DATE: 10-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 10-Apr-95

PAGE 2 OF 2

Bldg Number: 10110

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
Sub Total	0.0	2,397.8	583.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	629.3	3

ENERGY CALCULATIONS

BUILDING 10112

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10112

Building Sq.Ft.: 49,162

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 10112
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	2.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10112

Building Sq.Ft.: 49,162

System Type 12
System Name: BASEBOARD RADIATION
System Number: HE2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10112

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	129.4	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	129.4	4.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10112

Building Sq.Ft.: 12,289

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10112
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.6	
Sub Total	0.0	1,683.3	101.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	113.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10112

Building Sq.Ft.: 12,289

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS	REQUIRED	PRESENT
CALCULATIONS	HR/YR	HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10112
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.6	
Sub Total	0.0	1,683.3	101.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	113.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10112

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCM/LC

PAGE 1 OF 2

Building Sq.Ft.: 12,289

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU4

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUI	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FM	0	0
CHWRI	9.57	9.57
OARI	7.40	7.40
OPTI	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10112
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.6	
Sub Total	0.0	1,683.3	101.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	113.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10112

Building Sq.Ft.: 36,867

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
151	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FM	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10112
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	87.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10112

Building Sq.Ft.: 36,867

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

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Bldg Number: 10112

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	87.8	3

ENERGY CALCULATIONS

BUILDING 10114

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,114

Building Sq.Ft.: 47,038

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,114
System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	2.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,114

Building Sq.Ft.: 47,038

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,114

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	4.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10114

Building Sq.Ft.: 11,760

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10114
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.3	
Sub Total	0.0	1,683.3	97.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	108.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10114

Building Sq.Ft.: 11,760

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10114
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.3	
Sub Total	0.0	1,683.3	97.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	108.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10114

Building Sq.Ft.: 35,279

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10114

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	84.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10114

Building Sq.Ft.: 35,279

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10114
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	84.1	3

ENERGY CALCULATIONS

BUILDING 10120

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10120

Building Sq.Ft.: 12,450

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10120

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
Sub Total	0.0	8,501.7	163.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	176.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10120

Building Sq.Ft.: 12,450

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10120

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
Sub Total	0.0	4,791.4	31.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	33.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10120

Building Sq.Ft.: 12,450

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10120

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6
 CLIENT PROJECT ENGINEER: STEVE ROWLEY
 LOCATION: FT. DRUM

BLDG: 10120

Building Sq.Ft.: 12,450

System Type 12
 System Name: BASEBOARD RADIATION
 System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:
 Enter Weeks of Winter:

20
32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 10120
System Type 12
System Name: BASEBOARD RADIATION
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
Sub Total	0.0	2,397.8	583.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	629.3	3

ENERGY CALCULATIONS

BUILDING 10122

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,122

Building Sq.Ft.: 49,156

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 10,122
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	2.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,122

Building Sq.Ft.: 49,156

System Type 12
System Name: BASEBOARD RADIATION
System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 10,122
System Type 12
System Name: BASEBOARD RADIATION
System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	4.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10122

Building Sq.Ft.: 12,289

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10122

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.6	
Sub Total	0.0	1,683.3	101.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	113.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10122

Building Sq.Ft.: 12,289

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10122
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.6	
Sub Total	0.0	1,683.3	101.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	113.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10122

Building Sq.Ft.: 12,289

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10122
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.6	
Sub Total	0.0	1,683.3	101.6	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	113.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10122

Building Sq.Ft.: 36,867

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10122

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	87.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10122

Building Sq.Ft.: 36,867

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

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Bldg Number: 10122

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	87.8	3

ENERGY CALCULATIONS

BUILDING 10124

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10124

Building Sq.Ft.: 47,038

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

EMC NO.: 1406-006

DATE: 14-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	14.77
HOAOHC	110.07	9.07
COAOC	0.00E+00	2.10E-05
COAOHC	0.00E+00	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	1.26E-05
NSUCHC	0.00E+00	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	8.71E+03
NSC	4.86E+04	5.97E+04
FV	0	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 14-Apr-95

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Bldg Number: 10124

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	2.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,124

Building Sq.Ft.: 47,038

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,124

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	4.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10124

Building Sq.Ft.: 11,760

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10124
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.3	
Sub Total	0.0	1,683.3	97.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	108.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10124

Building Sq.Ft.: 11,760

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10124
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.3	
Sub Total	0.0	1,683.3	97.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	108.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10124

Building Sq.Ft.: 11,760

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU4

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10124
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.3	
Sub Total	0.0	1,683.3	97.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	108.9	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10124

Building Sq.Ft.: 35,279

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU5

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAH	0.00	0.00
HOAH	0.00	0.00
COAH	0.00E+00	0.00E+00
COAH	0.00E+00	0.00E+00
HOAH	0.00	0.00
HOAH	0.00	0.00
COAH	0.00E+00	0.00E+00
COAH	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10124

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	84.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10124

Building Sq.Ft.: 35,279

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10124

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	84.1	3

ENERGY CALCULATIONS

BUILDING 10130

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10130

Building Sq.Ft.: 13,305

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10130
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.5	
Sub Total	0.0	8,501.7	174.5	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	8,501.7	188.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10130

Building Sq.Ft.: 13,305

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10130
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	33.2	
Sub Total	0.0	4,791.4	33.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	4,791.4	35.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10130

Building Sq.Ft.: 13,305

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 10130

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,328.6	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,328.6	1.9	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10130

Building Sq.Ft.: 13,305

System Type 12
System Name: BASEBOARD RADIATION
System Number: HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 10130

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	623.3	
Sub Total	0.0	2,397.8	623.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	48.3	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	2,397.8	672.5	3

ENERGY CALCULATIONS

BUILDING 10132

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,132

Building Sq.Ft.: 50,156

System Type 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,132

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	3.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,132

Building Sq.Ft.: 50,156

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,132

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	7.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 14
System Name: VENTILATION
System Number: AHU-1

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

12-Apr-95

PAGE 2 OF 2

Bldg Number: 10132
System Type 14
System Name: VENTILATION
System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 14

System Name: VENTILATION

System Number: AHU2

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95

PAGE 2 OF 2

Bldg Number: 10132
System Type 14
System Name: VENTILATION
System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type: 14
System Name: VENTILATION
System Number: AHU3

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10132

System Type: 14

System Name: VENTILATION

System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,092.0	0.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 14

System Name: VENTILATION

System Number: AHU-4

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4779
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95

PAGE 2 OF 2

Bldg Number: 10132
System Type 14
System Name: VENTILATION
System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10132

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	75.9	
Sub Total	0.0	1,683.3	75.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	85.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer: 20
Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

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Bldg Number: 10132

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	75.9	
Sub Total	0.0	1,683.3	75.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	85.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU8

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

01-Apr-95

PAGE 2 OF 2

Bldg Number: 10132

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	75.9	
Sub Total	0.0	1,683.3	75.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	85.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 17,053

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10132
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	75.9	
Sub Total	0.0	1,683.3	75.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	85.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 35,279

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU10

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10132

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	77.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	77.5	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10132

Building Sq.Ft.: 35,279

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU11

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10132
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU11

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	92.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	92.5	3

ENERGY CALCULATIONS

BUILDING 10134

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,134

Building Sq.Ft.: 59,693

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 10,134
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	287.5	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	287.5	3.8	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10,134

Building Sq.Ft.: 59,693

System Type 12
System Name: BASEBOARD RADIATION
System Number: HE-2

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95
PAGE 2 OF 2

Bldg Number: 10,134
System Type: 12
System Name: BASEBOARD RADIATION
System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	7.3	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type 14

System Name: VENTILATION

System Number: AHU1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95
PAGE 2 OF 2

Bldg Number: 10134
System Type 14
System Name: VENTILATION
System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 17,053

System Type 14

System Name: VENTILATION

System Number: AHU-2

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

12-Apr-95

PAGE 2 OF 2

Bldg Number: 10134
System Type 14
System Name: VENTILATION
System Number: AHU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
TOTAL	0.0	5,092.0	0.0	0

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type 14

System Name: VENTILATION

System Number: AHU3

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10134
System Type 14
System Name: VENTILATION
System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,092.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type: 14
System Name: VENTILATION
System Number: AHU4

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10134
System Type 14
System Name: VENTILATION
System Number: AHU4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	5,092.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	5,092.0	0.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10134
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	125.9	
Sub Total	0.0	1,683.3	125.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	141.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU7

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10134

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	125.9	
Sub Total	0.0	1,683.3	125.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	141.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU8

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10134

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	125.9	
Sub Total	0.0	1,683.3	125.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	141.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 20,296

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95
PAGE 2 OF 2

Bldg Number: 10134
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	125.9	
Sub Total	0.0	1,683.3	125.9	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	1,683.3	141.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 39,397

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU10

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10134

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	92.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	92.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10134

Building Sq.Ft.: 39,397

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU11

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10134

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	0.0	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	92.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	0.0	92.2	3

ENERGY CALCULATIONS

BUILDING 10150

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10150

Building Sq.Ft.: 18,460

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10150

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
Sub Total	0.0	12,801.7	174.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,801.7	237.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10150

Building Sq.Ft.: 18,460

System Type 2

System Name: H&V UNIT

System Number: AHU2

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 10150
System Type: 2
System Name: H&V UNIT
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	294.7	
Sub Total	0.0	15,122.3	294.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	106.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	15,122.3	401.2	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10150

Building Sq.Ft.: 18,460

System Type 2

System Name: H&V UNIT

System Number: AHU3

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10150
System Type: 2
System Name: H&V UNIT
System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	260.0	
Sub Total	0.0	18,308.0	260.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	93.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	18,308.0	354.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10150

Building Sq.Ft.: 18,460

System Type 2

System Name: H&V UNIT

System Number: AHU4

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10150

System Type 2

System Name: H&V UNIT

System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	416.1	
Sub Total	0.0	27,177.0	416.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	150.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	27,177.0	566.4	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10150

Building Sq.Ft.: 18,460

System Type 2

System Name: H&V UNIT

System Number: AHU5

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10150
System Type 2
System Name: H&V UNIT
System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	173.4	
Sub Total	0.0	11,550.2	173.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	62.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	11,550.2	236.0	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

175

Building Sq.Ft.: 19,439

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95
PAGE 2 OF 2

Bldg Number: 175
System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	29.2	
Sub Total	0.0	7,181.9	29.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	7,181.9	39.8	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10150

Building Sq.Ft.: 18,460

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

06-Apr-95

PAGE 2 OF 2

Bldg Number: 10150

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	128.3	
Sub Total	0.0	3,637.0	128.3	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	46.3	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	3,637.0	185.8	3

ENERGY CALCULATIONS

BUILDING 10170

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 2

System Name: H&V UNIT

System Number: HV1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	100.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170
System Type: 2
System Name: H&V UNIT
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.1	
Sub Total	0.0	83,884.9	24.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	30.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10170

Building Sq.Ft.: 25,984

System Type 2

System Name: H&V UNIT

System Number: HV2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

04-Apr-95

PAGE 2 OF 2

Bldg Number: 10170

System Type 2

System Name: H&V UNIT

System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.1	
Sub Total	0.0	101,035.1	24.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	101,035.1	30.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 2

System Name: H&V UNIT

System Number: HV3

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95
PAGE 2 OF 2

Bldg Number: 10170
System Type 2
System Name: H&V UNIT
System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.1	
Sub Total	0.0	83,884.9	24.1	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	30.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 2

System Name: H&V UNIT

System Number: HV4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1

LOOK-UP VALUE		
EFFHP	88.10%	88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 10170

System Type: 2

System Name: H&V UNIT

System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.0	
Sub Total	0.0	83,884.9	12.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	83,884.9	15.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.4	
Sub Total	0.0	56,826.3	14.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	18.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10170

Building Sq.Ft.: 25,984

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.2	
Sub Total	0.0	56,826.3	7.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	9.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10170

Building Sq.Ft.: 25,984

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.4	
Sub Total	0.0	56,826.3	14.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	18.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170
System Type: 1
System Name: H&V UNIT WITHOUT RETURN FAN
System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.4	
Sub Total	0.0	56,826.3	14.4	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	18.1	3

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10170

Building Sq.Ft.: 25,984

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-5

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCM/MLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.2	
Sub Total	0.0	56,826.3	7.2	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	9.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10170

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.0	
Sub Total	0.0	56,826.3	12.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	56,826.3	15.1	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-7

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

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Bldg Number: 10170

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	4.8	
Sub Total	0.0	29,644.0	4.8	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	29,644.0	6.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10170

Building Sq.Ft.: 25,984

System Type 12
System Name: BASEBOARD RADIATION
System Number: HTP1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 10170

System Type 12

System Name: BASEBOARD RADIATION

System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	57.7	
Sub Total	0.0	12,616.7	57.7	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.7	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	99.0	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10170

Building Sq.Ft.: 25,984

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95
PAGE 2 OF 2

Bldg Number: 10170
System Type: 9
System Name: CONVERTER AND PUMPS
System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	34.2	3

EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10170

Building Sq.Ft.: 25,984

System Type 9

System Name: CONVERTER AND PUMPS

System Number: HTP3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

05-Apr-95

PAGE 2 OF 2

Bldg Number: 10170

System Type: 9

System Name: CONVERTER AND PUMPS

System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
Sub Total	0.0	12,616.7	0.0	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.0	12,616.7	31.5	3